

**FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL (ARV)
TREATMENT IN ADULTS AT A HOSPITAL IN NAMIBIA**

by

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DECLARATION

I declare that **FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL (ARV) TREATMENT IN ADULTS AT A HOSPITAL IN NAMIBIA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



SIGNATURE

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ABSTRACT

The aim of the study was to minimise non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment. A quantitative cross-sectional descriptive study was conducted on a sample of 112 non-adherent adults. Data collection was through structured interviews and patients' records review. Data analysis was by descriptive statistics. Rate of non-adherence was 36.7%. Characteristics common in the sample were, being a woman, age of 31-45 years, being unmarried, low educational status, lack of HIV status disclosure, feeling that taking ARVs reminded one of HIV and experience of ARV side effects. Reasons for missed doses included forgetting, alcohol use, access to care, work commitments, lack of food, stress and travelling. Of the respondents, 86.6% had unsuppressed viral loads. Recommendations include use of reminders, automated SMS, establishing treatment supporters and collaborative efforts in reducing active substance use to improve adherence.

Key concepts

Adherence; adult; antiretroviral (ARV) treatment; Health Belief Model; Human immunodeficiency virus (HIV); non-adherence.

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- The Ethical Committees of UNISA Department of Health Studies and Namibia Research Ethics Committee.
- The statistician, Dr L Mahachi, for his expertise.

Dedication

*To my husband Dr Arthur T, my son Asher T and
daughter Andra T Chigova.*

TABLE OF CONTENTS

CHAPTER 1	1
ORIENTATION TO THE STUDY	1
1.1 INTRODUCTION.....	1
1.2 BACKGROUND INFORMATION.....	4
1.3 THE SOURCE TO THE RESEARCH PROBLEM	5
1.4 STATEMENT OF THE RESEARCH PROBLEM.....	7
1.5 AIM OF THE STUDY.....	8
1.5.1 Research purpose.....	8
1.5.2 Research objectives	8
1.6 SIGNIFICANCE OF THE STUDY.....	8
1.7 DEFINITIONS OF TERMS	8
1.7.1 Adherence assessment.....	9
1.7.2 Adherence to antiretroviral therapy.....	9
1.7.3 Adult.....	9
1.7.4 AIDS	9
1.7.5 ARVs.....	10
1.7.6 Health Belief Model	10
1.7.7 HIV.....	10
1.8 THEORETICAL FOUNDATIONS OF THE STUDY	10
1.8.1 Research paradigm.....	10
1.8.2 Theoretical framework.....	11
1.9 RESEARCH DESIGN AND METHOD	17
1.10 SCOPE AND LIMITATION OF THE STUDY	17
1.11 STRUCTURE OF THE DISSERTATION.....	17
1.12 CONCLUSION	18
CHAPTER 2	19
LITERATURE REVIEW	19
2.1 INTRODUCTION.....	19
2.2 THE HIV/AIDS DISEASE	19
2.3 HIV/AIDS TREATMENT	20
2.4 ELIGIBILITY CRITERIA FOR STARTING ANTIRETROVIRAL TREATMENT IN NAMIBIA	21
2.5 ART REGIMENS.....	22
2.6 ACCESS TO ANTIRETROVIRAL THERAPY	25
2.6.1 Access to antiretroviral therapy globally	25
2.6.2 Access to antiretroviral therapy in sub-Saharan Africa	25

2.6.3	Access to antiretroviral therapy in Namibia.....	26
2.7	NON-ADHERENCE TO ANTIRETROVIRAL TREATMENT.....	26
2.7.1	Adherence.....	26
2.7.2	Importance of adherence to antiretroviral treatment	27
2.7.3	Non-adherence	27
2.7.4	Consequences of non-adherence to ARV treatment.....	28
2.8	ASSESSING PATIENT ADHERENCE TO ARV TREATMENT.....	28
2.8.1	Direct or objective methods.....	29
2.8.2	Indirect or subjective method.....	29
2.8.3	Electronic patient monitoring system (EPMS).....	30
2.9	THE PROBLEM OF NON-ADHERENCE TO ANTIRETROVIRAL THERAPY	30
2.9.1	Non-adherence in developed countries	31
2.9.2	Non-adherence in Africa.....	31
2.9.3	Non-adherence in Namibia.....	31
2.9.4	Non-adherence at the study site.....	32
2.10	FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL THERAPY IN ADULT PATIENTS.....	32
2.10.1	Patient-related factors	32
2.10.2	Health delivery system related factors.....	34
2.10.3	Disease and treatment related	36
2.10.4	Cultural and religious factors	37
2.11	CONCLUSION	38
	CHAPTER 3.....	39
	RESEARCH DESIGN AND METHODOLOGY	39
3.1	INTRODUCTION.....	39
3.2	RESEARCH DESIGN.....	39
3.3	RESEARCH METHODOLOGY	40
3.3.1	Population and sampling	40
3.3.2	Data collection.....	47
3.3.3	Data analysis	53
3.4	INTERNAL AND EXTERNAL VALIDITY OF THE STUDY.....	54
3.4.1	Face validity	54
3.4.2	Content validity.....	55
3.4.3	Construct validity.....	55
3.5	RELIABILITY.....	55
3.6	CONCLUSION	56

CHAPTER 4.....	57
ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESEARCH FINDINGS	57
4.1 INTRODUCTION.....	57
4.2 DATA MANAGEMENT AND ANALYSIS	57
4.3 RESEARCH RESULTS.....	58
4.3.1 Identify non-adhering patients from the clinical visits and EPMS and confirm with patient care booklet.....	58
4.3.2 Determine the factors associated with non-adherence in adult patients to ARV treatment.....	59
4.4 OVERVIEW OF RESEARCH FINDINGS	93
4.5 CONCLUSION	94
CHAPTER 5.....	95
CONCLUSIONS AND RECOMMENDATIONS.....	95
5.1 INTRODUCTION.....	95
5.2 RESEARCH DESIGN AND METHOD	95
5.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS	96
5.3.1 Non-adherence at the study site.....	96
5.3.2 Factors associated with non-adherence	97
5.3 RECOMMENDATIONS	103
5.3.1 Perceived susceptibility	103
5.3.2 Perceived severity	104
5.3.3 Perceived benefits.....	104
5.3.4 Perceived barriers	104
5.3.5 Cues to action	105
5.3.6 Self-efficacy	106
5.4 CONTRIBUTIONS OF THE STUDY.....	106
5.5 LIMITATIONS OF THE STUDY.....	107
5.6 CONCLUDING REMARKS.....	107
LIST OF REFERENCES	109

ANNEXURES.....	123
Annexure A: Ethical clearance from UNISA.....	124
Annexure B: Application to Namibia Research Committee to conduct study.....	125
Annexure C: ClearAnce letter from Namibia Research Ethics Committee	127
Annexure D: Signed declaration form for Data collectorS	128
Annexure E: Declaration form for data collectors.....	130
Annexure F: Informed consent form	132
Annexure G: English data collection tool	133
Annexure H: Oshiwambo translation tool.....	138
Annexure I: Afrikaans translation tool	144

LIST OF TABLES

Table 1.1	Distribution of patients at the study site according to adherence scores	7
Table 2.1	Namibia recommended 1st line regimen.....	23
Table 2.2	Namibia recommended 2nd line ART regimen.....	25
Table 4.1	Distribution of respondents by source of support	65
Table 4.2	Summary of the reasons shared by respondents for missing dose/s	88
Table 4.3	Respondents responses on any additional comments	92

LIST OF FIGURES

Figure 1.1	Political map of Namibia.....	3
Figure 1.2	Health Belief Model	12
Figure 1.3	Conceptual framework of the study: factors associated with high rate of non-adherence to ARV treatment in adults.....	16
Figure 2.1	Algorithm for evaluating suspected ARV treatment failure	24
Figure 4.1	Distribution of respondents by sex	59
Figure 4.2	Age distribution of respondents	60
Figure 4.3	Distribution of respondents by ethnicity	61
Figure 4.4	Distribution of respondents by religion.....	62
Figure 4.5	Respondents marital status.....	63
Figure 4.6	Respondents highest level of education	64
Figure 4.7	Living conditions of the respondents	65
Figure 4.8	Employment status of the respondents	66
Figure 4.9	Respondents responses to ART is essential for the HIV patient.....	67
Figure 4.10	Comfort of respondents in taking ARVs in the presence of others.....	68
Figure 4.11	Distribution of respondents by use of active substances	68
Figure 4.12	Distribution of respondents by frequency in use of active substances in the past 1 month	69
Figure 4.13	Distribution of respondents by disclosure of HIV status to community	70
Figure 4.14	Emotional statuses of respondents in the past 1 month.....	71
Figure 4.15	Respondents responses on taking ARVs remind them of the HIV infection	72
Figure 4.16	Distribution of respondents on convenience of clinic	73
Figure 4.17	Respondents satisfaction with the healthcare workers	74
Figure 4.18	Respondents have ever found the pharmacy out stork of your ARVs.....	75
Figure 4.19	Respondents duration on ARV treatment	76
Figure 4.20	Distribution of respondents who have experienced ARV side effects	77
Figure 4.21	Distribution of respondents who have special instructions regarding ARVs and food.....	78
Figure 4.22	Distribution of respondents by their health status in the past 1 month	79
Figure 4.23	Distribution of respondents' responses on whether taking ARV medicines offend their cultural beliefs	80
Figure 4.24	Respondents responses on whether HIV infection can be treated by cultural methods without ARV medicines	81
Figure 4.25	Distribution of respondents on whether taking ARV medicines offend any of their religious beliefs	82

Figure 4.26	Respondents responses on whether they think HIV infection can be treated by religious methods without ARV medicines	83
Figure 4.27	Respondents Adherence score	84
Figure 4.28	Respondents viral load.....	85
Figure 4.29	Respondents WHO clinical stage	86

LIST OF ABBREVIATIONS

ABC	Abacavir
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ARV(s)	Antiretroviral Drug(s)
AZT	Azidothymidine
CD4	Cluster of Differentiation 4
D4T	Stavudine
DNA	Deoxyribonucleic Acid
EFV	Efavirenz
EPMS	Electronic Patient Monitoring System
GRN	Government of the Republic of Namibia
GDP	Gross Domestic Product
HAART	Highly Effective Antiretroviral Therapy
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
MOHSS	Ministry of Health and Social Services
NNRTI	Non-nucleoside Reverse Transcriptase Inhibitor
NTRI	Nucleoside Reverse Transcriptase Inhibitor
PCB	Patient Care Booklet
PEPFAR	President's Emergency Plan For AIDS Relief
PI	Protease Inhibitor
PLHIV	Persons Living with HIV and AIDS
RNA	Ribonucleic Acid
TDF	Tenofovir
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations International Children's Emergency Fund
UNISA	University of South Africa
VL	Viral Load
WHO	World Health Organization
3TC	Lamivudine

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

The Human immunodeficiency virus (HIV) remains a global challenge. According to Joint United Nations Programme on HIV/AIDS (UNAIDS 2016:6), new infections among adults remained nearly static in 2015 at about 1.9 million [1.7 million–2.2 million]. By the end of 2015, the total number of people living with HIV were 36.7 million [34.0 million–39.8 million] (UNAIDS 2016:1). The UNAIDS Gap Report highlights that southern Africa is the worst affected region worldwide and is widely regarded as the 'epicentre' of the global HIV epidemic (UNAIDS 2014:6). According to World Health Organization (WHO), Swaziland is known to have the highest HIV prevalence worldwide at 27.4% while South Africa has the largest epidemic globally with 5.9 million people living with HIV in that country (WHO 2013:[13]). HIV prevalence in Western and Eastern Africa are generally low to moderate. For example, Senegal has a prevalence of 0.5% while Kenya's prevalence stands at 6% (UNAIDS 2014:6). Young women, children, sex workers, men who have sex with men and injection drug users have been identified as key risk groups in the HIV epidemic in sub-Saharan Africa.

The WHO report on HIV treatment global update, impact and opportunities (WHO 2013:[10]) notes that social behaviour, cultural practices, economics and other factors have been associated with the high HIV burden in sub-Saharan Africa. While internationally the first case of HIV was diagnosed in the early 1980s, in Namibia the first case was only reported in 1986 (Ministry of Health and Social Services (MoHSS) 2009:2). Since 1992, the MoHSS has conducted National HIV Sentinel Survey (NHSS) every second year among pregnant women seeking antenatal care services at the primary healthcare clinics (MoHSS 2014b:5). This data has been used by the MoHSS in approximating the HIV trends in Namibia. As observed from this data, Namibia has unfortunately become one of the countries with a high HIV prevalence in the world with 13.1% of the adult population living with HIV in 2013 (MoHSS 2014b:3). The 2014 NHSS report describes Namibia as a high, generalised and mature HIV prevalence country (MoHSS 2014b:5).

HIV is assumed to be primarily transmitted through heterosexual and mother-to-child transmission. It was estimated that over 234,508 people above the age of 15 years were living with HIV in Namibia in 2014. The same report notes that, the Government of the Republic of Namibia (GRN) has mounted an aggressive and tireless campaign against HIV and AIDS disease comprising of: surveillance, prevention, treatment, care and support, and impact mitigation. In the financial year 2013/14, from the total expenditure on all HIV programmes in Namibia, the GRN contributed the biggest and most remarkable portion of 64.0%. The remaining 36% was from other non-governmental partners including the President's Emergency Plan for AIDS Relief (PEPFAR), Global Fund and other international and national organisations (MoHSS 2013b:4).

The Namibia National Health Policy Framework 2010-2020 (MoHSS 2009:6) states that HIV/AIDS is Namibia's major health problem and the nation's number one health priority. As stipulated in the National Policy on HIV/AIDS (MoHSS 2007:2), the ministry is offering continuum of HIV care to people living with HIV and their families, which is a comprehensive package of HIV prevention, diagnosis, treatment and support services. HIV treatment can dramatically extend the lifespan of people living with HIV and effectively prevent HIV transmission (UNAIDS 2014:2). Namibia's anti retro-viral therapy (ART) roll out has been very successful, achieving more than 84% coverage against a national target of 90% (MoHSS 2014a:3). Key drivers of this success has been centered on government commitment and collaborations with partners. According to the 2014 sero-sentinal survey, the district in which the study was conducted had an HIV prevalence of 10.6% (MoHSS 2014b:16).

However, despite the successful role out in Namibia, patients oftenly failed to meet the level of adherence required for successful ART. The challenge of non-adherence to ART treatment has also been noted at the study site. The importance of adherence in HIV treatment cannot be over-emphasised as the consequences of non-adherence to ARV treatment can be dire. In a study done in Nigeria, Uzochukwu, Onmujekwe, Onoka, Okoli, Uguru and Chukwuogo (2009:189) warn that outcomes of non-adherence to ARV medication include viral resistance, treatment failure, toxicities and waste of financial resources. As such, it is recommended that policy makers and programme managers need to address the factors responsible for non-adherence when scaling up subsidised ARV treatment programmes.

Ehlers and Tshisuyi (2015:[1]) reported that there was a strong correlation between adherence and clinical outcomes. Therefore, there is need for healthcare workers to do in-depth analysis of factors influencing adherence if they intent to improve the ART adherence of their patients. Gill, Hamer, Simon, Theo and Sabin (2005:1243) proposed that given the large number of patients whose HIV infection will progress to AIDS if adherence is suboptimal, research is urgently needed to determine factors influencing adherence so that the most effective interventions to ensure adherence in African cohorts can be employed. Henceforth this study envisaged to identify factors associated with non-adherence to ARV treatment in adult patients in a hospital in Namibia.

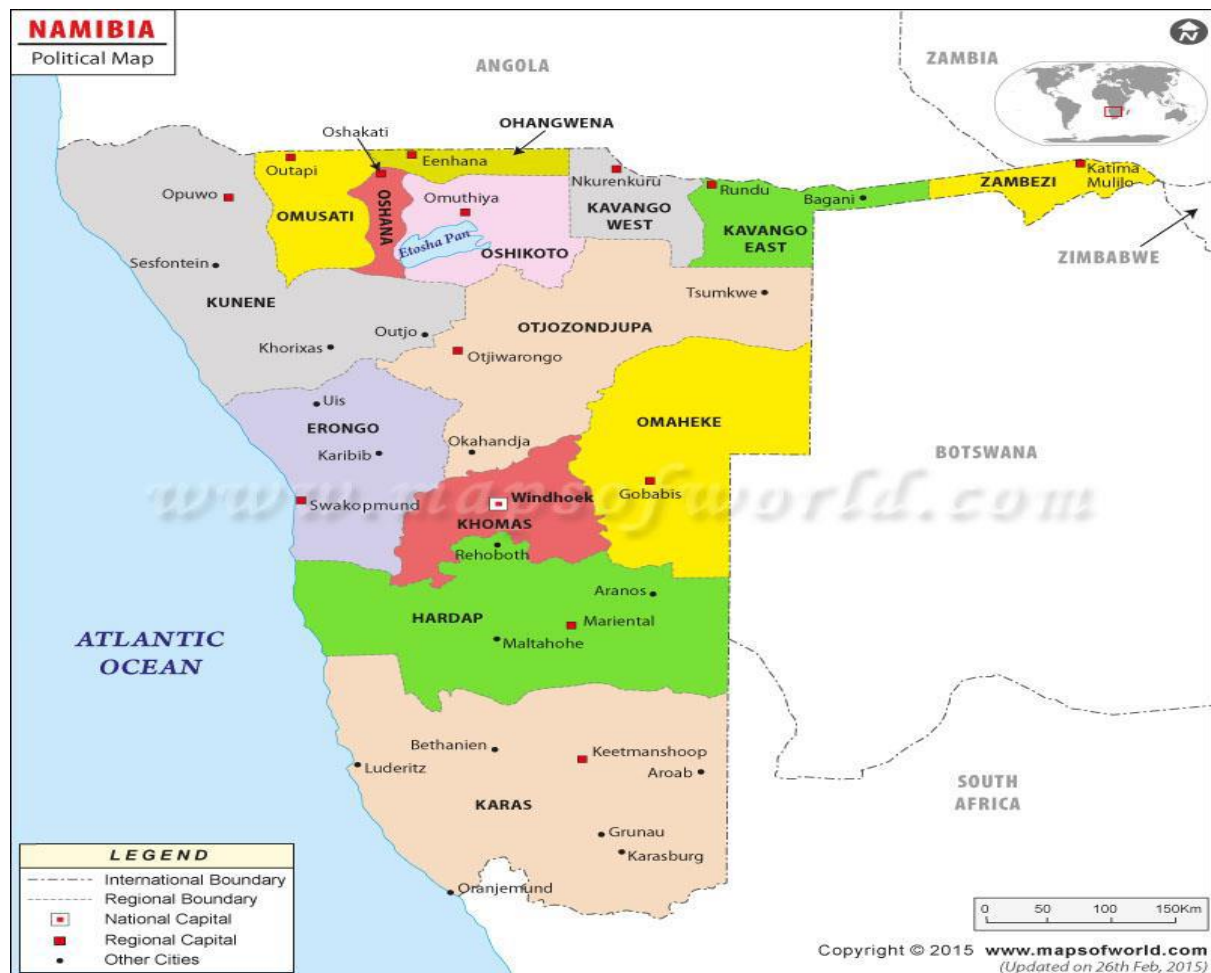


Figure 1.1 Political map of Namibia

(Source: Ministry of Health and Social Services 2015)

Namibia has a surface area of approximately 824,116 square kilometres. With a population of 2.1 million the country has the second lowest population density in the world at 2.5 inhabitants per square kilometre (Namibia Statistics Agency (NSA) 2013:3).

The nation is divided into 14 administrative regions where health services are delivered. The regions vary in population density, and are higher in the northern parts of the country (NSA 2013:3). The Namibia Demographic and Health Survey (MoHSS 2013a:2) states that Namibia is ranked as a middle income country and has one of the most skewed distributions of income per capita in the world. The economy is largely dependent on mining, fishery, large-scale farming and high-end tourism. Namibia's average spending on the health sector is above that of most countries in sub-Saharan Africa and some middle income countries. According to the report on "Namibia AIDS Response progress", Namibia spends more than 6% of her gross domestic product (GDP) on health (MoHSS 2013c:11).

The study site was a district hospital in southern Namibia. It lies 500 km south of the capital Windhoek along the B1 route to South Africa. It is located in Keetmanshoop, the regional capital of the //Karas Region, which has a population of approximately 36002 people of whom 54% is urban population (NSA 2013:3). Majority of the inhabitants are Nama-Damara speaking people while other tribes from the north of the country have migrated to the district for various economic opportunities. Economic activities are centred on small livestock farming, agricultural activities at Naute Dam and the Neckartal Dam construction project. The Nama-Karoo vegetation around the study site supports goat and sheep husbandry but little crop farming is done due to erratic rainfall (NSA 2013:6). The construction of the Neckartal dam along Fish River 70 km outside the town has been the most significant contributor of migration into the district. Upon its completion this dam will be the largest in-land dam in Namibia and it is anticipated to boost and transform the economic landscape of the district. The MoHSS provides health services to the district through one district hospital, 2 health centres and five clinics.

1.2 BACKGROUND INFORMATION

Although there has been a general increase in access to HIV treatment and care across some African countries including Namibia, adherence to the medicines remains a challenge. Ehlers and Tshisuyi (2015:[1]) highlight that as ART is becoming increasingly available in developing countries, adherence challenges calls for even greater attention.

In a Chinese study, Muessig, McLaughlin, Nie, Cai, Zheng, Yang and Tucker (2014:988) reported an 18.9% non-adherence rate among the study respondents. Reda and

Biadigilin (2012:4) are of the opinion that African HIV/AIDS patients have similar if not higher adherence levels compared to those of developed countries. Non-adherence is closely associated with treatment failure and AIDS related deaths even when the patient is on ARV treatment. It is in this view that the Namibia ART guidelines (MoHSS 2014a:14) recommends that there should be on-going attention and reinforcement of adherence throughout the entire course of ART for a successful HIV programme.

WHO (2003:[27]) classifies factors influencing patient adherence into socioeconomic factors, treatment related factors, patient-related factors, disease related factors and healthcare delivery system related factors. Concerning patient related factors Nuwagaba-Biribonwoha, Pals, Kidder, Carpenter, Katuta, DeLuca, Bupamba, Maokola and Bachanas (2014:[123]) noted that patient characteristics associated with non-adherence include alcohol use, depressive symptoms, and younger age. Commenting on system related factors such as health facility operating hours and availability of ARV medicines in pharmacies, Wasti, Van Teijlingen, Simkhada, Randall, Baxter and Kirkpatrick (2012:75) highlighted that stock out of medicines was a common reason for missing ARV medications resulting in patient non-adherence to ART. Patient-healthcare worker relationships have also been listed among factors influencing patient ability to take ARV medicines as agreed with clinicians (Abdissa 2013:120). De and Dalui (2012:251) report that bad attitude of healthcare workers was associated with patient non-adherence to ART. WHO (2003:[27]) also classified some of the factors as being related to the HIV disease itself. Kranzer, Lewis, Ford, Zeinecker, Orrell, Lawn, Bekker and Wood (2010:17) reported that previous illnesses or having other health conditions were positively associated with good adherence. Culture has also been observed to play a major role on peoples' beliefs and view towards medical interventions (Tomori, Kennedy, Brahmbhatt, Wagman, Mbwando, Likindikoki & Kerrigan 2014:907).

1.3 THE SOURCE TO THE RESEARCH PROBLEM

Literature suggests several factors that could be associated with non-adherence to Antiretroviral treatment. Factors such as long distances to health facilities, alcohol abuse, poverty and low educational level may predispose patients to non-adherence and these appeared to be influential in the study setting (Tabatabai, Namakhoma, Tweya, Phiri, Schnitzler & Neuhaus and Glob Health Action 2014:[6]). //Karas region in which the study site is located is the least densely populated region in Namibia with a density of 0.5

people per square kilometre (NSA 2013:32). The generally arid conditions experienced in the region and the lack of industrial activity have been linked with poverty in the district. The education status of the population is rather low when compared with other districts in the country. With such a high level of non-adherence, such as observed from the study site at 47%, the challenge of non-adherence to ARV treatment calls for more detailed assessment in order to promote adherence and improve health outcomes in the HIV programme. The high rates of non-adherence to ARVs at this site was a major factor in influencing choice of site for this research study.

The clinic opens Monday to Friday every week 8-5 pm and it closes during 1-2 pm for lunch. Patients return to the clinic at varying intervals depending on discretion of the professional nurse or doctor as assessed by the adherence and clinical condition of the individual patient. The predominant return follow-up is usually 30 days with the maximum being 90 days. At every visit the patient is reviewed by a professional nurse and if required is referred to the doctor. After being reviewed during the follow up visits, patients collect their ARVs from the pharmacy which are dispensed by pharmacy professionals, either a pharmacist or pharmacist assistant.

According to the EPMS. in January 2015 the study site had 1289 adults receiving ARV medicines. On average, the clinic serves about 250 to 400 patients in a month. Table 1.1. below shows the distribution of patients at the study site according to adherence scores as observed from the EPMS during the period October to December 2014. A total of 933 patients received follow-up care at the study site. Of these patients 53% (n=530) achieved required adherence scores of more than or equal to 95% while approximately 47% (n=403) were assessed as non-adherent during the healthcare workers adherence assessment.

Table 1.1 Distribution of patients at the study site according to adherence scores (Data from the study site electronic monitoring system (EPMS) January 2015)

Month	Adult patients adherence assessment scores		
	Good (>95%)	Fair (75-95%)	Poor (<75%)
October	156	75	20
November	235	118	40
December	139	102	48
Quarter(Oct-Dec 2014)	530	295	108

1.4 STATEMENT OF THE RESEARCH PROBLEM

The GRN through the MoHSS provides free HIV care services including the ARVs. However, it is of concern that a recognisable number of patients do not take their medicines as prescribed by healthcare professionals. Although most patients attend their scheduled follow-up dates, a significant number were found not to be taking their ARVs as per their agreement with healthcare workers. At every follow-up visit the patient adherence is assessed by healthcare workers using the pill count method and verbal discussion with the patient. Based on the remaining pill count adherence assessment is calculated as medicines taken as a fraction of dispensed medicines. Namibia adopted the recommendations of WHO 2004 where good adherence is above 95%, fair is 85-95%, and poor is less than 85%. Patient immunological markers like CD4 and viral load as reported in the patient records supplement this data on adherence assessment. The individual patient adherence assessment scores are captured manually in the patient care booklet (PCB) and electronically in the electronic patient monitoring system (EPMS). As noted above in the last quarter of year 2014, the study site had a non-adherence rate of 47%. The challenge of non-adherence to ARV treatment calls for attention if the HIV programme is to be successful. Studies have shown a correlation between higher levels of adherence and improved virological and clinical outcomes (MoHSS 2014a:15), while non-adherence to ARVs have been highly associated with poor ARV treatment outcomes, resistance and HIV related deaths (Okoronkwo, Okeke, Chinweuba & Iheanacho 2013:[2]).

1.5 AIM OF THE STUDY

The purpose and objectives of this study were as stipulated below.

1.5.1 Research purpose

The aim of this study was to minimize non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment.

1.5.2 Research objectives

The following objectives guided this study:

- To identify non-adhering patients from the clinical visits and EPMS and confirm with patient care booklet in a hospital in Namibia.
- To determine the factors associated with non-adherence in adult patients to ARV treatment.
- To recommend to stakeholders methods to facilitate adherence in patients on ARVs.

1.6 SIGNIFICANCE OF THE STUDY

Determining the factors associated with non-adherence of patients to ARV medicines will assist healthcare workers in anticipating non-adherence and assist at promoting adherence for patients living with HIV. This information is of assistance to MoHSS in policy making and reviewing guidelines of HIV management. Home based care organisations taking care of HIV patients, non-governmental organisations (NGOs) and other partners working in the fight against HIV especially at the site of study will be the beneficiaries of findings of this study.

1.7 DEFINITIONS OF TERMS

The following terms were used frequently in this study:

1.7.1 Adherence assessment

The World Health Organization (WHO) describes adherence assessment as a state of the art measurement on the extent to which a person's behaviour, taking medication, following a diet and or executing a lifestyle changes, corresponds with agreed recommendations from a healthcare provider (WHO 2003:[17]). This measurement may be based on subjective, objective or biochemical data.

1.7.2 Adherence to antiretroviral therapy

Adherence is the fact of behaving according to a particular rule or following a particular set of beliefs or fixed way of doing (*Oxford Advanced Learner's Dictionary of current English* 2010, sv "adherence"). Reda and Biadgilign (2012:148) define adherence as taking medications or interventions correctly according to prescription. Sahay, Reddy and Dhayarkar (2011:836) comment that, "adherence is a patient's ability to follow a treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medications." Adherence includes several operational subunits of definition. For example, adherence to dosage means number of pills taken as prescribed, adherence to schedule means taking pills consistently on time and finally dietary adherence is taking pills as prescribed with/ after/ or before meals (Sahay et al 2011:836).

1.7.3 Adult

An adult is a fully grown person who is legally responsible for their actions(*Oxford Advanced Learner's Dictionary of current English* 2010, sv "adult"). According to the Constitution of the Republic of Namibia, any persons 18 years or older can make their own decision individually as an adult (Ministry of Regional and Local Government and Housing 2002:13). In this research an adult is a person 21 years or older as he/she can make a consent to be a respondent in the research on his/her own.

1.7.4 AIDS

Acquired immunodeficiency syndrome (AIDS) is a term which applies to the most advanced stages of HIV infection. It is defined by the occurrence of any of more than 20

opportunistic infections or HIV-related cancers (WHO 2016b:[1]). The Centre for Disease control (CDC) defines AIDS as when the immune system of a person with HIV infection becomes severely compromised measured by CD4 count or person becomes ill with an opportunistic infection (CDC 2015:2).

1.7.5 ARVs

Anti-retroviral medications (ARVs) are medications used to treat HIV. They fight HIV by stopping or interfering with the reproduction of the virus in the body, reducing the amount of virus in the body. There are different classes of ARVs and they act at different stages of the HIV life cycle (WHO 2016b:[3]).

1.7.6 Health Belief Model

A conceptual framework that describes a person's health behaviour as an expression of the health beliefs. The model was designed to predict a person's health behaviour, including the use of health services and to justify intervention to alter maladaptive health behaviour (*Mosby's Dictionary of Medicine, Nursing and Health Professions* 2013, sv "Health Belief Model").

1.7.7 HIV

Human immuno-deficiency virus is a viral infection which infects cells of the immune system, destroying or impairing their function (WHO 2016b:[1]).

1.8 THEORETICAL FOUNDATIONS OF THE STUDY

1.8.1 Research paradigm

A paradigm is a world view, a general perspectives on the complexities of the world (Polit & Beck 2012:11). This study adopted the positivism paradigm. Polit and Beck (2012:12) describe the assumption of positivism paradigm also known as logical positivism as being that reality out there that can be studied and known. The ontologic assumption was that the real world of an HIV patient on ARV treatment has natural causes of how a patient takes his/her ARV treatment and those causes or factors are ensuing effects including

non-adherence and the outcomes of non-adherence thereafter. The epistemologic assumption of the research was that the principal investigator and the data collectors were independent from the patients who became respondents. The data collectors had no influence upon respondents either in their choice to participate in the research or in the responses they would give. Reliability and validity of the data collection instrument was rigorously ensured because the axiologic assumption was to see objectivity in the study and avoid biases. The methodologic question pursues to collect evidence using scientific methods. The researcher focused on objective and quantifiable data, therefore data could be presented numerically. The sample was large enough and representative of patients attending the study site. The researcher was purely external without influence and used statistical analysis to make generalisations of the research results. In summary, the positivist paradigm used in this research assumed that when adults on ARVs are non-adherent to their medicines there are factors which are influencing such a phenomena, and that it is not haphazard. The assumption of this study was that there are factors associated with non-adherence in adult patients on ARVs and these factors can be studied and be known.

Polit and Beck (2012:13) highlight the following assumptions of the positivist paradigm which this study also adopted:

- There is a real natural world driven by real natural causes and ensuing effects.
- The researcher is independent from those being researched, and findings will not be influenced by the researcher.
- Seek objectivity hence forth need to rule out biases.
- Theory has to be verified.
- Concepts should be specific and discreet.
- There is a specific design.
- Information should be quantifiable, able to be analysed.
- Generalisations can be made on the findings.

1.8.2 Theoretical framework

A framework is the overall conceptual underpinnings of a study (Polit & Beck 2012:128). Miller and Hays (2000:177) point out that several conceptual frameworks have been

created to help understand and study adherence. Several social theories of health behaviour including the Health Belief Model (HBM) among others have been used to investigate adherence determinants. The HBM shown in Figure 1.2 below was the theory of choice in this study due to its applicability to patient adherence and preventative health practices (Polit & Beck 2012:136).

1.8.2.1 The Health Belief Model

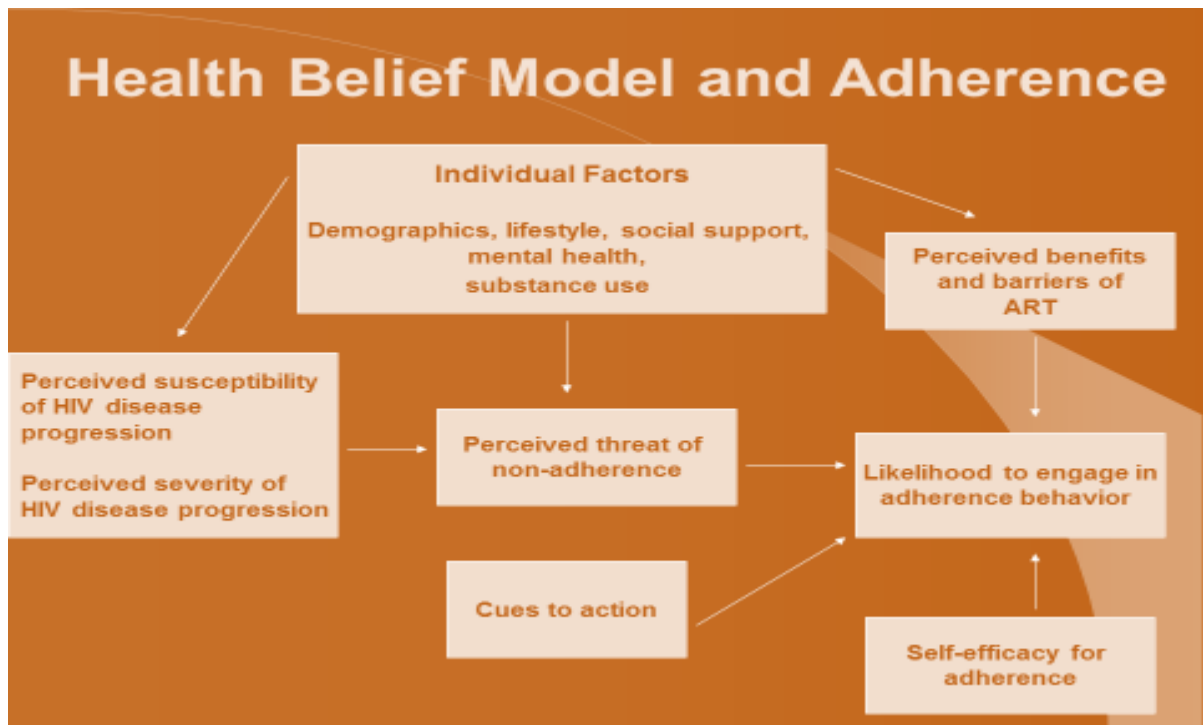


Figure 1.2 Health Belief Model

(Source: Eller 2009:20)

According to Smeltzer, Bare, Hinkle and Cheever (2010:50), the HBM was developed by Becker and colleagues in 1974. Smeltzer et al (2010:50) describe the four variables of the HBM as follows:

- First variable is demographic and disease factors including patient characteristics such as gender, age, level of education, employment status severity of disease and duration of illness.
- Second variable is barriers which are factors that leading to absence or difficulty in accessing the health aspect. Barriers to ART treatment adherence could include transport costs, side effects, lack of understanding among others.

- Resources is the third variable. These are factors enhancing the health behaviour for example family support in taking ART treatment could enhance adherence.
- Fourth and last variable is the perceptual factors. These consists of how the person views his or her health status, self-efficacy and perceived demands of the illness.

Alternatively Polit and Beck (2012:136) outline the four major components of HBM as follows:

1.8.2.1.1 Perceived susceptibility

This refers to how a person perceive himself or herself as being in danger of a health problem. In this study these were the perceptions of the HIV positive patient that the problem of the infection is relevant to him or her and trusts that the HIV diagnosis is correct. The assumption of the study was that patients whose perception of their susceptibility of HIV disease progression to AIDS maybe suboptimal therefore leading to non-adherence to ARV treatment

1.8.2.1.2 Perceived severity

This construct focusses on how serious does the individual feel the health problem is. For this research it referred to the personal views of the HIV positive adult that the HIV diagnosis is a serious diagnosis with severe implications to health therefore requires appropriate action like adhering to medicines. This concept have a direct bearing on how the patient will adhere to the ARV treatment. The lower the perception of severity the higher the non-adherence to ARV treatment.

1.8.2.1.3 Perceived benefits and costs

This component of the HBM focuses on the individual patient's belief in a health behavior in this study meaning ART treatment will treat the HIV infection. The individual patient needs to believe that adherence to ART would reduce susceptibility to HIV disease progression and severity. This was the basis for questions in the questionnaire which inquired about how essential ART was to the individual patient. The perceived costs shows that the individual's belief that the materials, physical and psychological costs of adhering to ART are all outweighed the benefits. Related costs in adhering to ART

treatment includes transport costs to treatment facility, disclosure and lifestyle changes to accommodate living positively with the HIV infection.

1.8.2.1.4 Motivation

This is the willingness to comply to a health behavior in this study it meant to comply with ART treatment requirements. This component stresses that even if all components are in place, an individual needs motivation to take ARVs as prescribed is necessary, absence of which non-adherence to treatment sets in. This is influenced by availability of social support e.g. family members.

1.8.2.1.5 Enabling or modifying factors

Under this component the study was investigating variables that could be influencing adults not to adhere to ART. The modifying factors include patient satisfaction and sociodemographic factors (Polit & Beck 2012:136). Therefore the data collection tool of the study inquired on how much respondents were satisfied with the healthcare workers and convenience of the clinic. Sociodemographic characteristics including gender, age, religion and employment were also investigated as they were potential modifying characteristics.

To further understand modifying and enabling factors for patient adherence to ART treatment, this research pursued to understand factors associated with non-adherence. In this regard, Joubert and Ehrlich (2007:56) reported that David Werner a community development theorist and health activist believed that in order to have a critical understanding of health problems, a problem analysis tool like the “why” game should be used to determine contributing factors. According to the Werner problem analysis tool, factors related to any health problem can be classified under environmental factors, service related, disease related, socio-economic, cultural/religious and political factors. WHO (2003:[27]) states that the different dimensions affecting ARV treatment adherence are health system, condition-related factors, therapy-related factors, socioeconomic and patient-related factors. These agree with Chesney (2000:S173) who states that the principal factors associated with non-adherence appear to be the system of care, patient related, while other factors are inconvenient dosing frequency, dietary restrictions, pill burden and side effects and patient-healthcare provider relationships. Ehlers and

Tshisuyi (2015:[4]) re-iterate that barriers to adherence includes forgetfulness, transportation costs, loss of income due to absence from work during clinic visits. In a study conducted by Uzochukwu et al (2009:189) in Nigeria, they reported that reasons for non-adherence included physical discomfort (side effects); clinics out of stock of ARVs; forgetfulness and fear of social rejection among many other reasons.

The researcher adopted the HBM theory and used the Werner problem analysis tool to understand factors associated with non-adherence to ARV treatment in adults attending the study site. The framework had the following structure: patient related, system related, disease and treatment related, cultural and religious beliefs related factors that influence adherence to HIV treatment. These subtopics guided this research.

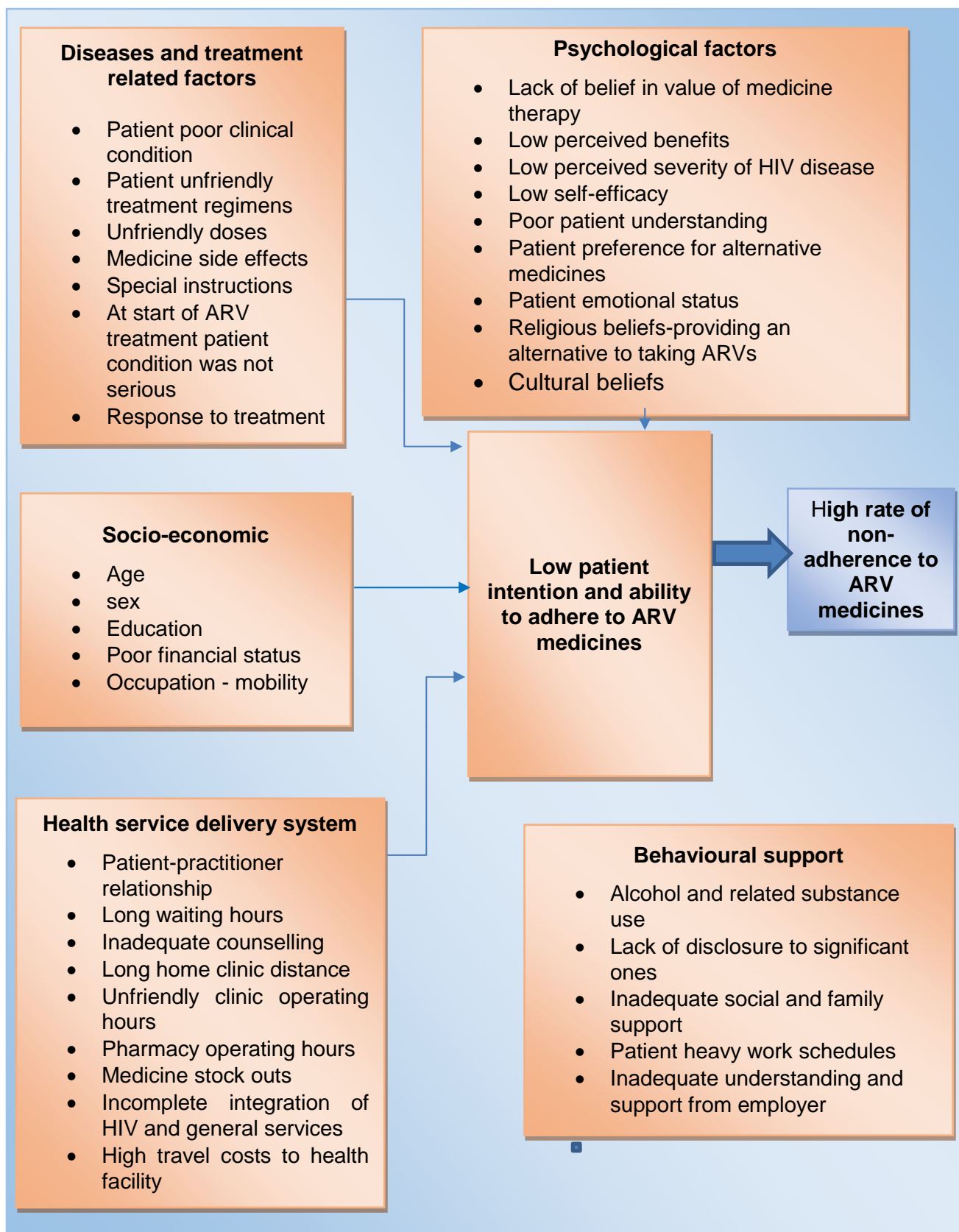


Figure 1.3 Conceptual framework of the study: factors associated with high rate of non-adherence to ARV treatment in adults

(Source: Joubert & Ehrlich 2007:58)

1.9 RESEARCH DESIGN AND METHOD

A quantitative descriptive study was conducted. This research design and method was explained in greater detail in chapter three of this dissertation.

1.10 SCOPE AND LIMITATION OF THE STUDY

The study respondents were drawn from only one site at a hospital in Namibia.

1.11 STRUCTURE OF THE DISSERTATION

This dissertation consisted of five chapters. Each chapter had an introduction, body and conclusion. The chapters were outlined as follows:

Chapter 1: Orientation of the study

Aimed at giving the reader a comprehensive but brief overview of the dissertation. It highlighted on HIV at global, regional and country level. It also outlined the research problem, purpose, objectives, significance of the study, scope of study, theoretical grounding of the study, research design and method, and ethical considerations.

Chapter 2: Literature review

This chapter reviewed literature on the concepts of adherence and non-adherence to ARVs, adherence assessment and effects of non-adherence. Focus on non-adherence to ARVs globally, regionally, in Namibia and at study site was discussed. Detailed information about demographic factors, patient related factors, cultural and religious and health delivery system factors associated with non-adherence were discussed.

Chapter 3: Research design and methodology

The third chapter of this dissertation explained in detail the study design and data collection of the study. A thorough explanation of sampling methods and data collection for this study made up this chapter.

Chapter 4: Analysis presentation and description of the research findings

The fourth chapter presents the study findings, analysis using statistical methods and summarised the findings.

Chapter 5: Conclusions and recommendations

The final chapter reported on conclusions and recommendations made from the study.

1.12 CONCLUSION

This chapter outlined a summarised insight into the study. It introduced the research problem, highlighted on the conceptual framework which was used in this study, the study design, and ethical considerations which were considered in this study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The second chapter of the study focussed on the literature that was accessed, reviewed and used by the researcher in this study. Aveyard (2010:5) defined literature review as a comprehensive study and interpretation of information which is associated with a particular topic. The researcher had a research question and undertook a thorough search of literature and analysed it. The key terms in this research were factors, non-adherence and Anti-retroviral treatment. The aim of this chapter was to acquaint the reader on the work that has already been done in the area of non-adherence to HIV treatment. The literature review focussed on the period 2000–2016.

2.2 THE HIV/AIDS DISEASE

Engelkirk and Duben-Engelkirk (2015:318) describe HIV as a retrovirus which means its genetic material changed from ribonucleic acid (RNA) into deoxyribonucleic acid (DNA) in order to replicate. The HIV virus targets the langerhans cells of foreskin and anogenital region, the CD4 lymphocytes (T-Helper cells), macrophages, monocytes and glial cells. There are two types of HIV causing similar illnesses and driving the pandemic worldwide. HIV 1 is found worldwide and it is the main cause of the worldwide pandemic. HIV 2 is mainly found in West Africa, Mozambique and Angola. HIV 2 is less efficiently transmissible and rarely causes mother to child transmission. It is also less aggressive with slower disease progression than HIV 1 and some ARV medicines are ineffective to the HIV 2 (Engelkirk & Duben-Engelkirk 2015:318).

The Namibia Institute of Pathology (NIP) confirmed that the predominant strain found in Namibia is HIV-1 type C (MoHSS 2012:9). This is quite unfortunate because this HIV 1 type C is known to be the most virulent subtype with higher multiplication rates and it is associated with faster disease progression in adults (MoHSS 2014c:8). According to the Namibia 2014 sero-sentinel survey, 16.8% of the pregnant women attending anti-natal care at primary health clinics were HIV positive which shows that the HIV prevalence in

Namibia is high (MoHSS 2014b:3). The WHO report on HIV treatment global update, impact and opportunities (WHO 2013:[10]), noted that the social behaviour, cultural practices, economics and other factors have been associated with the high HIV burden in the sub-Saharan African region including Namibia. The social behaviour and cultural practices include people generally lacking correct and consistent use of condoms, inability to negotiate condom use, multiple and concurrent partnerships, high work-related migration and low rate of male circumcision.

Economical factors believed to fuel the HIV disease are poverty in most of the low to medium countries, poor access to HIV related information on prevention and care, women of generally frail economic status and cross generational sexual relationships also known as the “sugar-daddy” phenomenon. Of note in Namibia is the virological factor as the HIV sub-type C has contributed to high prevalence in sub-Saharan Africa (WHO 2013:[10]). This sub-type is the most virulent and prevalent subtype of the HIV virus. Other factors associated with the high HIV prevalence in sub-Saharan Africa is that countries generally had delayed response towards the HIV pandemic and the high prevalence of ulcerative Sexually transmitted illnesses (STI) which fuels the HIV disease. Increased alcohol and substance abuse have also been linked to the high HIV burden. It has also been documented that in sub-Saharan Africa men preferring and sometimes even demanding dry sex increased the risk of HIV transmission (WHO 2013:[10]).

2.3 HIV/AIDS TREATMENT

Anti-retroviral medications (ARVs) are medications used to treat Human Immunodeficiency Virus (HIV). These medicines which suppress HIV replication are often called highly active antiretroviral therapy abbreviated “HAART”. There are different classes of ARVs and they act at different stages of the HIV life cycle (WHO 2016b:[1]). Each class works at a different stage of the life cycle of the HIV infection. Standard antiretroviral therapy (ART) consists of a combination of antiretroviral (ARV) drugs used to maximally suppress the HIV virus and stop the progression of HIV disease to AIDS (WHO 2016b:[1]).

The Namibia ART guideline (MoHSS 2014a:16) explains that there are six classes of antiretroviral medicines. There are nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs) which are medications that inhibit the transcription of viral RNA into DNA, which is necessary for reproduction of the virus. Examples are Tenofovir (TDF), Zidovudine

(AZT), Lamivudine (3TC), Abacavir (ABC) and Emtricitabine (FTC). Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs) are another class which is chemically different that of NRTIs, but also inhibit transcription of viral RNA into DNA. Examples of medicines from this class are Nevirapine (NVP) and Efavirenz (EFV). A third class are the Protease Inhibitors (PIs). These medications act on the viral enzyme that cuts long chains of virally produced amino acids into smaller proteins. Class examples are Lopinavir (LPV), Indinavir (IDV), Saquinavir (SQV), ritonavir (RTV). There are also the Integrase Strand Transfer Inhibitors (ISTIs) which prevent the newly synthesised viral DNA from being integrated into the host cell DNA. This class includes two medicines: Raltegravir (RAL) and Dolutegravir (DTG). A fifth class is that of the Entry Inhibitors, which consist of one CCR5 co-receptor antagonist which prevents the HIV virus from attaching to the host cell CD4 co-receptor CCR5. An example is Maraviroc (MVR). The last class is called the Fusion Inhibitors, which block the HIV virus from being able to merge with the host CD4 cell after binding (MoHSS 2014a:16). The only currently available fusion inhibitor is Enfuvirtide (ENF).

2.4 ELIGIBILITY CRITERIA FOR STARTING ANTIRETROVIRAL TREATMENT IN NAMIBIA

In Namibia before ARV treatment is initiated, HIV positive patients are assessed for eligibility to start the treatment. WHO (2007:[12]) classifies HIV-associated clinical disease as stage 1 (asymptomatic), stage 2 (mild symptoms), stage 3 (advanced symptoms) and stage 4 (severe symptoms) WHO. In Namibia clinicians are guided in initiating anti-retroviral treatment by the Namibian ART guideline. Persons falling in the following criteria are eligible to be initiated on ART (MoHSS 2014a:13):

- CD4 count of less than 500 cells/mm³ regardless of WHO clinical stage.
- WHO clinical stage 3 or 4 regardless of CD4 count.
- All pregnant and breastfeeding women regardless of CD4 count or WHO clinical stage.
- HIV-hepatitis B co-infection regardless of CD4 count or WHO clinical stage.
- All HIV positive individuals in a sero-discordant sexual relationship regardless of CD4 count or WHO clinical stage so as to reduce the risk of HIV transmission to the negative partner.

- HIV positive sero-concordant couples currently intending to conceive a child, initiate ART in both partners regardless of CD4 count or WHO clinical stage.
- All children less than 15 years of age regardless of CD4 count or WHO clinical stage.

2.5 ART REGIMENS

Recommended ART regimens consist of a combination of two or three NRTIs plus a NNRTI or PI (MoHSS 2014a:17). Namibia recommends three different lines of ARVs; 1st line, 2nd line and 3rd line. As shown in table 2.1 below, the current preferred 1st line regimen in Namibia is a once daily tablet containing 3 ARVs, that is two NRTIs, Tenofovir (TDF) and Emtricitabine (FTC), as well as one NNRTI which is Efavirenz (EFV). Due to side effects of EFV on the central nervous system it is advised for this once daily tablet to be taken at night and not during the day. There are alternative regimens to the preferred first line depending on the individual patient and contraindication. Second line regimens are selected medicines combined together for use where the first line of ARVs is found to be ineffective or failing.

As shown in table 2.1 below, the current Namibian guideline recommends AZT1/TDF/3TC/LPV/r as a standard second line ARV treatment. However, if the patient has Hepatitis B co-infection the dose of Ritonavir is boosted from 100mg to 400mg. The third line regimens are ARVs used where ARV treatment failure happens while patient is on second line treatment. The guideline recommends that the medical practitioner prescribes such ARVs under the guidance and consultation of an HIV specialist.

Table 2.1 Namibia recommended 1st line regimen

1st line ART	Preferred 1st line Regimens	Alternative 1st line Regimens
Adults (including adolescents ≥ 10 years old and weigh at least 35 kg), pregnant and breastfeeding women, adults with TB disease and adults with HBV co-infection	TDF + FTC (or 3TC) + EFV (once daily FDC)	AZT + 3TC + EFV AZT + 3TC + NVP TDF + FTC (or 3TC) + NVP ABC + 3TC + EFV (or NVP)

(Source: MoHSS 2014a:17)

Patients who fail on the recommended regimens are evaluated for treatment failure. Figure 2.1 below of the Namibia ART guideline recommends that healthcare workers should do intensive counselling and rule out non-adherence before concluding treatment failure. Any viral load of above 1000 copies/mm³ is considered treatment failure as long as it is confirmed that the patient is adherent to the ARV medicines. Patients who are confirmed to have failed on first line regimen 1 are initiated on second line regimens as indicated in Table 2.2 that follows after the figure 2.1 below.

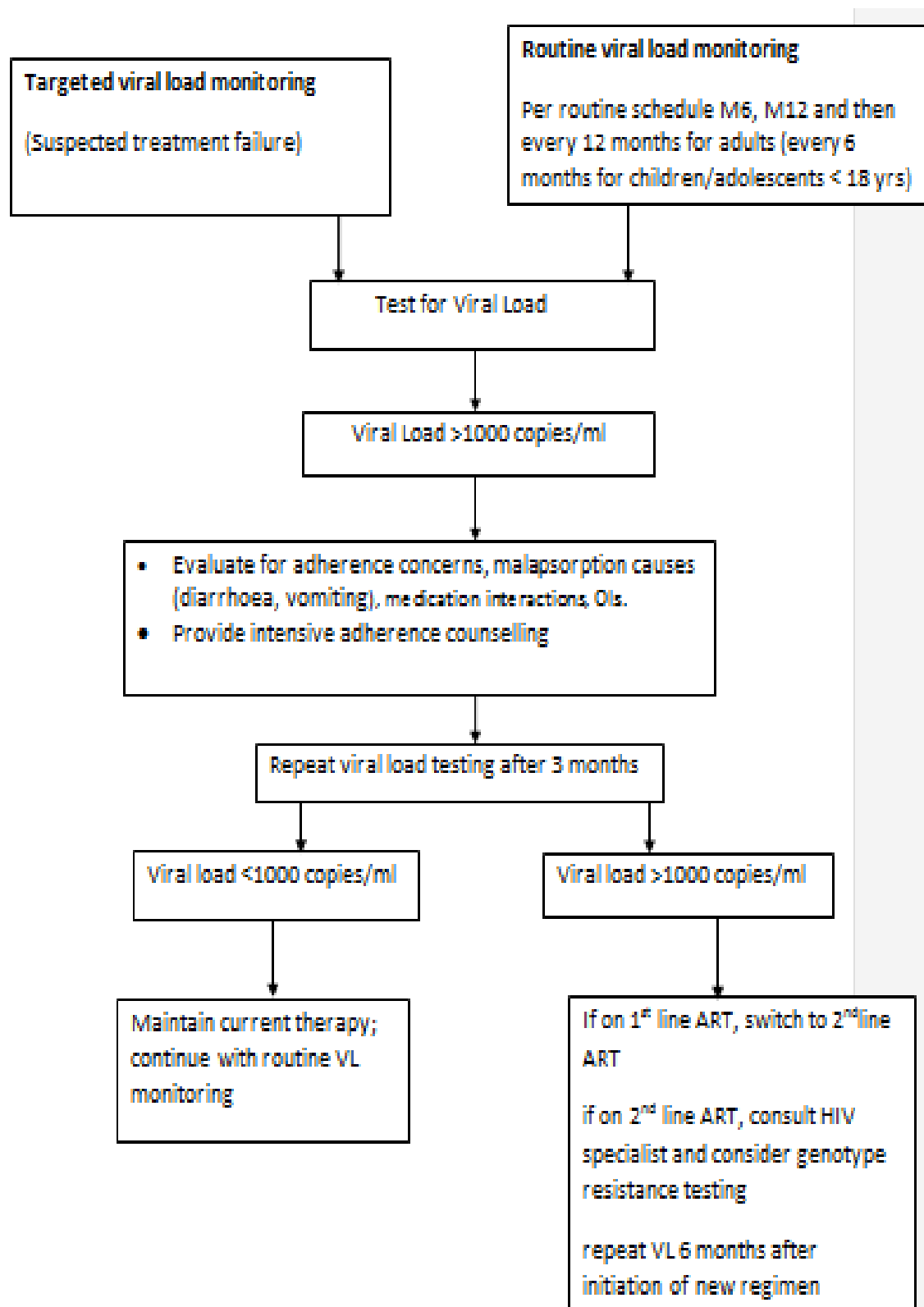


Figure 2.1 Algorithm for evaluating suspected ARV treatment failure
(Source: MoHSS 2014a:20)

Table 2.2 Namibia recommended 2nd line ART regimen

Target population	Regimen	Remarks
HIV positive adults	AZT/TDF/3TC/LPV/r	Where standard first line regimens were used
HIV positive pregnant and breastfeeding women		
HIV/HBV co-infection		
HIV/TB co-infection	AZT/TDF/3TC/LPV/RV	Increase dose of RTV: i.e., LPV/r 400mg/400mg

(Source: MoHSS 2014a:17)

2.6 ACCESS TO ANTIRETROVIRAL THERAPY

By 2010 the estimated global coverage of antiretroviral therapy in low and middle income countries still remained less than 50% (WHO/UNAIDS/UNICEF 2011:90).

2.6.1 Access to antiretroviral therapy globally

The global coverage of antiretroviral therapy reached 46% at the end of 2015 UNIADS (2016:3). The same report noted that the global consensus is to achieve the 90–90–90 treatment target by 2020. 90-90-90 means 90% of people living with HIV know their HIV status, 90% of the HIV-positive people are on anti-retroviral therapy and 90% of people on treatment have suppressed viral loads. This indicates that there is still more to be done to achieve this milestone. By end of 2015 about 54% of people living with HIV were still in need of treatment, and sadly most of them had never been tested for HIV and were unaware of their HIV status (UNIADS 2016:11).

2.6.2 Access to antiretroviral therapy in sub-Saharan Africa

There has been an increasing number of people living with HIV (PLHIV) in sub-Saharan Africa who are benefiting from the rapid scale-up of ARV treatment (Bezabhe, Chalmers, Berezni, Peterson, Bimirew & Kassie 2014:[1]). It is reported that Botswana, Eritrea, Kenya, Malawi, Mozambique, Rwanda, South Africa, Swaziland, Uganda, the United

Republic of Tanzania, Zambia and Zimbabwe all increased treatment coverage by more than 25 percentage points between 2010 and 2015 (UNIADS 2016:3). The increase in access to treatment have brought up a 26% decline in AIDS-related deaths. An outstanding example is that of South Africa where nearly 3.4 million people are on treatment, which is more than any other country in the world (UNIADS 2016:3). It therefore can be concluded that although access to ARV treatment have significantly increased over the past five years, there is still more work needed for patients in sub-Saharan Africa to access ART.

2.6.3 Access to antiretroviral therapy in Namibia

Namibia is has been internationally commended for having one of the most successful HIV care programmes worldwide. In 2014, MoHSS reported that ART roll out had been very successful, achieving more than 84% coverage against a national target of 90% (MoHSS 2014a:3). The provision of ARV treatment in state health facilities in Namibia started in 2003 followed up by a rapid scale-up of ART services. The total number of people receiving ART in Namibia increased from less than 100 in 2003 to 119,000 in 2014, approximately 60% of whom were women (MoHSS 2014b:4). The MoHSS has decentralised ART services to all 35 districts of the nation, currently bringing the services to local primary healthcare clinics through the integrated management of adult illnesses (IMAI). In 2012 the MoHSS in its effort to decentralise ART services it started training registered nurses to initiate and manage ART through the Nurse Initiated and management of antiretroviral therapy (NIMART) training (MoHSS 2012:1).

2.7 NON-ADHERENCE TO ANTIRETROVIRAL TREATMENT

In order to address the problem of non-adherence to ART in-depth, this subsection of the study first described what adherence is and the importance of adherence to ARV medicines. Thereafter, non-adherence is defined and its consequences thereof.

2.7.1 Adherence

Martin, Deborah, Calabresse, Wolters, Rogby, Brennan and Wood (2009:594) defined adherence as a percentage of prescribed medication doses taken over a given period of time. This definition is supported by Ingersoll and Cohen (2008:213) who describes

adherence as the level at which a patient's taking of his/her medication corresponds with the prescription. Sahay et al (2011:836) are of the opinion that adherence is the patient's ability to follow a treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medications. Adherence also includes several operational subunits of definition. For example, adherence to dosage means number of pills taken as prescribed, adherence to schedule means taking pills consistently on time and finally dietary adherence is taking pills as prescribed with/ after/ or before meal (Sahay et al 2011:836).

2.7.2 Importance of adherence to antiretroviral treatment

Literature has sufficient evidence that medication adherence of at least 95% is required in order to have sustainable viral suppression and improvement to clinical outcomes (Beer, Heffelfinger, Frazier, Mattson, Roter, Barash, Buskin, Rime & Valverde 2012:220). The great success story of HIV treatment is that the average life expectancy of people living with HIV, with effective adherence to ARV treatment has now been proven to be approaching that of the negative population (WHO 2013:[43]). The MoHSS in its 2014 ART Guideline notes that studies have proven a correlation between higher levels of adherence and improved virological and clinical outcomes (MoHSS 2014a:14). Nuwagaba-Biribonwoha et al (2014:[123]) are of the opinion that treatment efficacy relies on sustained adherence. They describe the importance of adherence to ARV medicines as being key to reducing morbidity and mortality of HIV-positive patients and significantly lowering the risk of HIV transmission to uninfected partners and children. In a study in Zambia, good adherence to ARVs has been linked to CD4 increases while CD4 counts appeared to decrease in patients who poorly adhered to their ARV treatment (Chi, Cantrell, Zulu, Mulenga, Levy, Tambatamba, Reid, Mwanga, Mwinga, Bulterys, Sage & Stringer 2009:751).

2.7.3 Non-adherence

There are two types of non-adherence. The first is primary non-adherence, in which healthcare workers write prescriptions but the medication is never initiated. This is also called non-fulfilment adherence (Jimmy & Jose 2011:155). Reda and Biadgilign (2012:149) define non-adherence as failure to take medications or interventions correctly according to prescription.

2.7.4 Consequences of non-adherence to ARV treatment

The potential burden of medication non-adherence outcomes on healthcare delivery makes it an important public health concern (National Council on Patient Information and Education 2007:[24]). Non-adherence to ARVs have been highly associated with poor ARV treatment outcomes, resistance and HIV related deaths (Okoronkwo et al 2013:[1]). Because of the negative outcomes associated with non-adherence, Nuwagaba-Biribonwoha et al (2014:[11]) warn that patients with characteristics associated to non-adherence need to be targeted for additional adherence counselling and support. In a study done in Nigeria, Uzochukwu et al (2009:189) cautioned that negative outcomes of non-adherence to ARV medication include viral resistance, treatment failure, toxicities and waste of financial resources. Gill et al (2005:1243) caution that even if on ARV treatment, large numbers of patients with HIV infection will progress to AIDS if their adherence to ARVs is suboptimal. Inadequate suppression of viral replication by ART is predominantly a consequence of poor adherence to medicines further causing low efficacy of the antiretroviral regimens and sadly viral resistance to the ARV medicines (Reda & Biadgilign 2012:148).

2.8 ASSESSING PATIENT ADHERENCE TO ARV TREATMENT

Nachega, Mills and Schechter (2010:71) are of the opinion that it is paramount to be aware that there have not been any gold standard methods for measuring medication adherence. Some are direct methods such as biological markers and others are indirect methods such as self-report, patient interview, pill counts, pharmacy records, computerised medication caps and viral load monitoring (Reda & Biadgilign 2012:149). All of these methods of assessing adherence have their own strengths and weaknesses (Jimmy & Jose 2011:157). Direct approaches are one of the most accurate methods of measuring adherence but are expensive. Direct measures precisely inform patient's adherence. Indirect measures are subjective and their advantage is that they can provide explanations for patient's non-adherence. Lam and Fresco (2015:[1]) advice that since a perfect measure of adherence does not exist, a multi-measure approach seems to be currently the most appropriate practise.

2.8.1 Direct or objective methods

2.8.1.1 Viral load assessment

The Namibia ART guideline recommends healthcare workers to take blood samples from patients at 6 months after starting ART for laboratory assessment. After 6 months of adhering to effective ART, the viral load of the patient is expected to be undetectable. Viral load of more than 1000 copies per ml is an indication of non-adherence and should be closely monitored and warrants a clinician to start investigating for treatment failure if non-adherence has been ruled out (MoHSS 2014a:14). In Namibia, including at the study site, after 6 months of initiating ART every patient's viral load is assessed at the National Institute Laboratory (NIP). The turnaround time for the viral load result from NIP to the site is 4 working days.

2.8.2 Indirect or subjective method

2.8.2.1 Self-report

Self-report is a method of measuring adherence in which the patient reports the number of doses missed over a given period (Nghoshi 2016:8). Various studies indicate that self-report adherence assessment method matches well with both viral load and clinical outcomes. Nieuwkerk and Oort (2005:445) suggest that although self-reports often overestimate adherence, the advantage is that it is inexpensive and fairly accurate for identifying patient adherence. While discussing with patient in adherence assessment, self-reports also help to determine reasons why the patient missed the ARV dose(s). Of the available methods to assess medication adherence, self-reports are arguably the most practical method for day to day use in a clinic (Nghoshi 2016:55). At the study site, self-reports are used to supplement the pill count method of assessing adherence.

2.8.2.2 Pill count

Pill count or refill method of assessing adherence assumes that prescription-refilling patterns correspond to the patient medication-taking behaviour. This assumption has been considered as an acceptable estimate (Barner 2010:30). In a study conducted in South-Eastern Louisiana on adherence to hypertensive medicines using pill count and self-report methods, pill count was a better indicator in cardiovascular disease than self-reports (Krousel-Wood, Holt & Joyce et al 2015:412). A strong positive association reported between ARV medicine adherence of more than 95% according to pill count and both virologic and immunologic failure has been proved (El-Khatib, Katzenstein, Marrone, Laher, Mohapi, Petzold et al 2011:[3]). At the study site, healthcare workers predominantly used pill count supplemented by patient self-report to assess ARV medication adherence. This is done in a private room in the clinic where a lay counsellor counts the remaining number of ARV tablets. The adherence score is then calculated as number of tablets taken as a fraction of dispensed ARVs.

2.8.3 Electronic patient monitoring system (EPMS)

Electronic prescription refill records requires a centralised computerised system along with a consistency among prescribers and dispensers to collect a complete dataset over that designated period. The disadvantage of this method is that it does not give many clues to the researcher or the health professionals concerning the barriers involved in the detected non-adherence in terms of individual patients (Krousel-Wood et al 2015:412). In Namibia, including at the study site, the EPMS automatically calculates the adherence of the patient to ARVs as it dispenses the new prescription. Other features of the EPMS is to report the patients who were due to come for ARV follow-up and they didn't turn up. This facility is used by the healthcare workers to follow-up the patient before the patient becomes an ART interrupter or worse still totally defaults the ART treatment.

2.9 THE PROBLEM OF NON-ADHERENCE TO ANTIRETROVIRAL THERAPY

While more persons are being initiated on ART yearly across the globe not all are able to adhere to the medicines. Some interrupt the treatment while others stop the ART altogether. The challenge of ART adherence has been found to vary across countries due to various reasons.

2.9.1 Non-adherence in developed countries

Globally, various studies have reported on adherence levels of patients to ARV treatment. Achappa, Madi, Bhaskaran, Ramapuram, Rao and Mahalingam (2013:222) in a study in India, report suboptimal adherence in respondents with 76% achieving the required adherence rate. While in Guangzhou China, a study among 721 adults on ARV treatment by Muessig et al (2014:988) revealed that 18.9% reported recent non-adherence and 6.8% reported treatment interruption. Non-adherence varies across nations with China approximately 20% and India with the highest non-adherence averaging 32%.

2.9.2 Non-adherence in Africa

Abdissa (2013:134) reported that the non-adherence rate among respondents in a study conducted in Ethiopia was found to be 20.0%. In a study conducted across 3 African countries (Kenya, Tanzania and Namibia) by the Centre for Disease Control (CDC) in 2014, they reported that concerns have been raised about suboptimal ART adherence among patients enrolled in HIV clinical care in Africa. In this CDC study, 14% reported missing ≥ 1 dose of ARVs in past 30 days which shows non-adherence rate of 14% (Nuwagaba-Biribonwoha et al 2014:[9]). This agrees with findings from a study conducted in Uganda by Senkomago, Guwatudde, Breda and Khoshnood (2011:1246) who highlighted that according to pill count adherence assessment, 13.6% of the patients were non-adherent. In spite of the findings highlighted above, Reda and Biadgilign (2012:148) maintain that against researchers' expectations, sub-Saharan African patients were found to have similar or higher adherence levels as compared to those of developed countries.

2.9.3 Non-adherence in Namibia

As highlighted above, the study by CDC showed non-adherence rate of 14% in Namibia (Nuwagaba-Biribonwoha et-al 2014:[9]). A recent study in the northern parts of Namibia revealed a non-adherence rate of 27% measured by pill count and 30% as per patient self-reporting (Nghoshi 2016:ii).

2.9.4 Non-adherence at the study site

Against the documented statistics of non-adherence rates of approximately 20% in developed countries, sub-Saharan Africa and even Namibian ranging from 14%-30% non-adherence, the study site had abnormally high levels of non-adherence. According to EPMS, in the quarter October to December 2014, 933 patients attended the hospital for their follow-up care. Of these patients 439 (47%) had an adherence score of less than 95% which is the minimum score regarded as good adherence. This resulted in a non-adherence level of 47% at the study site.

2.10 FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL THERAPY IN ADULT PATIENTS

Bolsewicz, Debattista, Vallely, Whittaker and Fitzgerald (2015:1429) suggest that the understanding of the context around patient's use of ARV treatment and reasons for treatment interruption and non-adherence remains poor consequently calling for research to be done in this scope. The WHO (2003:[27]) classifies the factors influencing the ability of a patient to take their ARVs as agreed together with healthcare workers into five categories. The five categories are socioeconomic factors, treatment related factors, patient-related factors, disease related factors and healthcare delivery system related factors.

2.10.1 Patient-related factors

Smeltzer et al (2010:50) report that the first variable of the Health Belief Model is Demographic factors like gender, age, level of education and employment status.

Reda and Biadgilign (2012:149) report that barriers to ART adherence include factors related to patients and their families. Patient characteristics associated with non-adherence include alcohol use, depressive symptoms, and younger age (Nuwagaba-Biribonwoha et al 2014:[10]). Other personal factors like low education and living alone were also associated with non-adherence (Muessig et al 2014:988). Some healthcare workers were of the opinion that lifestyle factors, such as homelessness, substance abuse, lack of education, and unstable mental state are predictors of non-adherence and some actually go on to withhold ARV treatment from such patients. In a study conducted

in Botswana, approximately 40% of the respondents admitted missing a dose because of alcohol consumption (Kip, Ehlers & Van Der Wal 2009:149). Other studies have yielded different results on age as an influencing factor on adherence. Abdissa (2013:65) reported that there was no statistically significant association found between the age of respondents and their adherence to antiretroviral therapy. In another study in America, Beer et al (2012:218) reported that younger age and excessive intake of alcohol and related substances were associated with non-adherence. Reporting on patient related factors associated with non-adherence, Gari, Doig-Acuña, Smail, Malungo, Martin-Hilber and Merten (2013:1) concluded that the factors associated with non-adherence are similar in both developed and developing countries. These included stigma and discrimination, alcohol and drug abuse, depression and low self-efficacy. One of the major reasons cited by patients for non-adherence was simply forgetting to take their medications (Gari et al 2013:4). These findings were similar to a study in Nigeria where 49.6% of patients mentioned forgetfulness as one of the major non-intentional reasons for not taking their ARV treatment correctly (Adisa, Alutundu & Fakeye 2009:165). Due to the influence of personal factors on adherence of patients to ARV treatment, the Namibian ART guideline (MoHSS 2014a:14) advises healthcare workers to consider the following social aspects that support better adherence to treatment; such as not abusing alcohol or being ready to stop alcohol abuse, not having unstable psychiatric disorders and being committed to lifelong ART treatment with strict adherence to treatment. However, the same guideline points out that no patient should be denied ART services due to failure to meet the above stipulated considerations.

2.10.1.1 Patient social support

Family support very crucial in fostering adherence. Some patients lack social support because they have not disclosed their status to significant others. Achappa et al (2013:222) contend that fear of being stigmatised has been associated with non-adherence. Li, Li, Lee, Wen, Lin, Wan and Jiraphongsa (2010:212) highlighted that poor family communication was associated with non-adherence. According to Franke, Murray, Munoz, Hernandez-Diaz, Sebastian, Atwood, Caldas, Bayona, Shin (2011:[1483]) disclosing to at least one family member about one's positive HIV status was associated with good adherence. The MoHSS (2014a:16) notes that it is desirable for all patients to have a treatment supporter. They define a treatment supporter as someone at home, in the community, or at the workplace, who can accompany the patient to visits and assist

the patient daily to adhere to ART. Notwithstanding, MoHSS comments that absence of a treatment supporter should not be a reason to deny treatment to a patient (MoHSS 2014a:16). Abdissa (2013:112) reported a statistically significant association between availability of social support in taking ARV treatment and adherence to ARV treatment ($P=0.023$). At the study site, although not compulsory, patients are encouraged to disclose their HIV status to a significant person who would become their treatment supporter through positive living. Within the community in which the study site is located, they are also support groups which support PLWHIV run by organisations such as Catholic AIDS Action.

2.10.2 Health delivery system related factors

The MoHSS recognises that the healthcare system may influence the adherence of patients to ARV treatment (MoHSS 2014a:10). The Namibia ART guideline recommends that healthcare workers need to be alert to such factors such as educating clients, proper dosing, managing side effects, access to care and the patient-healthcare provider relationship (MoHSS 2014a:10).

2.10.2.1 Health facility operating hours and ARV medicine stock outs

Wasti et al (2012:75) highlight that running out of pills was a reason for missing ARV medications. The WHO recently conducted studies in different African settings where it cited the problem of long waiting times at the health facilities as one of the major challenges to adherence (WHO 2016a:[25]). In Tanzania, the mean time spent at the clinic averaged six hours. About 50% (12/28) of the healthcare workers interviewed in Tanzania also noted long patient waiting times as a barrier to adherence. In Botswana, most respondents reported spending about four hours at the clinic to receive HIV care. In Uganda, the average waiting time for ARV users was about five hours in government facilities and one hour in private facilities.

Extrapolation of these findings shows that ARV patients may need to miss one working day per month in order to get their HIV care. This may pose problems for some patients whose employers are unaware of their HIV care and to those employers who simply do not support the employees need for care (WHO 2016a:[25]). As with other public facilities

in Namibia, the study site opens weekdays, Monday to Friday from 8 am to 5 pm and is closed during lunch hour, 1-2 pm, public holidays and weekends.

2.10.2.2 Patient-healthcare worker relationships

In relationship to HIV care, Stigma Index surveys have been conducted in more than 65 countries (UNAIDS 2016:10). In twenty-two of these countries, more than 10% of people living with HIV reported they had been denied healthcare because they were HIV positive. In some cases, the service rendered by healthcare workers in ART clinics was found to be below the expectation of patients and influences patient adherence to medicines. Flickinger, Saha, Moore and Beach (2013:366) reported that patients kept follow-up appointments better if the healthcare workers treated them with dignity and respect, listened carefully to them, explained in ways patient could understand, and above all treated them as human beings. Similar findings were recorded by Boyer, Clerc, Bonono, Marcellin, Bile and Ventelou (2011:1383) who noted that inadequate communication with healthcare workers was one of the reasons for non-adherence and treatment interruption. De and Dalui (2012:251) concur that bad attitude of healthcare workers was associated with patient non-adherence to ART. A significant relationship between perception of study respondents on patient-provider relationship and their adherence to antiretroviral treatment ($t=2.551$, $P=0.011$) was reported by Abdissa (2013:120). Mills, Nachega, Buchan, Orbinski, Attaran, Singh, Rachlis, Wu, Cooper, Thabane, Wilson, Guyatt and Bangsbe (2006:688) are of the opinion that healthcare workers need to utilise information on factors associated with non-adherence and engage in dialogue with patients in order to facilitate adherence.

2.10.2.3 Access to the clinic

The study site is the only one in the district serving a total population of 36001 people whom are scattered across the semi-arid desert area in southern Namibia. Distance to the health facility from patients' homes varies from a few hundreds of metres for those living near the hospital to around 200km for those staying in villages and on farms. A study conducted in Malawi revealed that among the reasons for interrupting ARV treatment by patients was transport costs to the clinic (Tabatabai et al 2014:[6]). The cost of accessing ARV clinics is also mentioned among reasons for interruption and non-adherence in Addis Ababa. Biadgilign, Deribew, Amberbir, Deribe and Sahara (2009:148)

noted that cost and access to transportation were associated with non-adherence. Similarly findings were reported in Uganda by Senkomago et al (2011:1246) who observed that transportation costs accounted for 7.8% of reasons why patients were non-adherent to their ARV medicines. In another study in Philadelphia, patients discussed 18 barriers or facilitators to retention in care and ART adherence. Among the eleven most common factors that came up included co-location of services and service delivery factors such as access to care (Holtzman, Shea, Glanz, Jacobs, Gross, Hines, Mounzer, Samuel, Metlay & Yehia 2015:817).

2.10.3 Disease and treatment related

The WHO (2003: [27]) acknowledges that some factors influencing patients' adherence are related to the HIV infection and the ARV treatment itself.

2.10.3.1 Disease related

The effects of the disease state of a patient on adherence could be two way. In a study in South Africa, Kranzer et al (2010:17) reported that previous illnesses or having other health conditions were positively associated with good adherence. The MoHSS also agrees that some patients who initiate ART with CD4 of above 350 may not feel sick and as such may not fully understand the consequences of non-adherence (MoHSS 2014a:13). Therefore, they point out that healthcare workers should thoroughly counsel such patients beforehand. On the other hand, some patients who are too sick may lose hope in ARVs while still others maybe too sick to take ARVs resulting in the patients being non-adherent.

2.10.3.2 Treatment related

Uzochukwu et al (2009:189) revealed physical discomfort from side effects of ARVs and non-availability of drugs at treatment sites among the reasons for non-adherence. Patients who had a CD4 of over 200 cells/ml, after being on ART for less than 15 months were found to be more non-adherent (Charurat, Oyegunle, Benjamin, Habib, Eze, Ele, Ibanga, Ajayi, Eng, Mondal, Gebi, Iwu, Etiebet, Abimiku, Dakum, Farley & Blatter 2010:[3]). Abdissa (2013:98) pointed out that respondents who had changed their HIV

medication had suboptimal adherence as compared to those who had not changed ARV medication.

2.10.4 Cultural and religious factors

Culture is defined as values, norms, habits and ways of life characteristic of a coherent social group. On the other hand religion can be understood as a set of beliefs adhered to by the members of a community, involving symbols regarded with a sense of awe or wonder, together with ritual practices (Giddens & Sutton 2013:1054). These two aspects influence daily decisions of human beings including their views and perceptions to interventions such as medicines like ART.

2.10.4.1 Cultural factors

Beliefs of patients to ART is well-documented to have impacted on adherence. Gari et al (2013:7) reported that poor beliefs in the benefits of ARVs were associated with non-adherence to ART. Some cultures do not approve of ARVs thereby influencing patients not to take their ARV treatment as agreed with healthcare workers. Wasti et al (2012:75) indicated that fear of disclosure of one's HIV status to the community has been highly associated with non-adherence. Experience of discrimination among patients was also associated with poor adherence in low income countries (Charurat et al 2010:[5]). Culture plays a major role in people's beliefs. In fact, Tomori et al (2014:907) concluded that numerous socio-cultural barriers inhibit retention in HIV care and promote non-adherence. The study site is situated in southern Namibia where the Nama culture is more prevalent. Cultural diversity is enhanced by migrants from the northern parts of the country.

2.10.4.2 Religious factors

In a study conducted in Nigeria by Charurat et al (2010:[6]), they reported that religion had influence on ability of patient to take medicines. of note was that being Muslim was associated with non-adherence to ARV treatment. Tomori et al (2014:907) advocate that healthcare workers should develop partnerships with alternative healers in order to reduce non-adherence due to cultural and religious beliefs. Tabatabai et al (2014:[6]) also reiterates that religious belief or perceived stigma were some of the factors associated

with non-adherence in a study in Malawi. In rural South Africa, Loeliger, Niccolai, Mtungwa, Moll and Shenoi (2016:982) highlight that among the key themes for non-adherence included tension between ART and alternative medicine. The community in which their study was conducted had various religions but predominantly Christianity.

2.11 CONCLUSION

This chapter reviewed literature on HIV globally, in sub-Saharan Africa, Namibia and at the study site. Literature on ARV treatment, adherence, and implications of non-adherence were also discussed. It concluded by focussing on factors associated with non-adherence to ARV treatment. The next chapter discussed the methodologies used in the research.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The previous chapter dealt with literature reviewed related to the study. This chapter of the dissertation explained in detail the study design and outlined data collection of the study. Description of sampling and data collection methods are well-defined including ethical considerations pertaining to the methods used. It completes by explaining how internal and external validity were ensured in this study.

3.2 RESEARCH DESIGN

Polit and Beck (2012:741) define a research design as the overall plan for addressing a research question laying out specifications in order to enhance the study integrity. On the same note Burns and Grove (2011:253) put it forward as a blueprint of conducting a study.

The research design of this study was a cross-sectional descriptive design. Cross-sectional studies are carried out at one time point over a short period (Polit & Beck 2012:741). The purpose is to estimate the prevalence of the outcome of interest or sometimes to investigate associations between risk factors and the outcome of interest. However, cross-sectional designs are limited by the fact that they are carried out at one time point and give no indication of the sequence of events. According to Punch (2005:28), quantitative researchers collect facts and study the relationship of one set of facts to another, using numerical data, typically structured and predetermined research questions, conceptual frameworks and designs while qualitative researchers perspectives are more concerned about understanding individual's perceptions of the world. De Vos, Strydom, Fouché and Delport (2011:156) noted that non-experimental studies measure relevant variables at a specific time and there is no manipulation of variables and do not include a control group.

This research design was applicable as it met the objectives of the study in which the researcher sought to identify non-adhering adult patients and most importantly being able to determine the factors associated with non-adherence.

The independent variable is the presumed source of influence which in this study were the factors associated with non-adherence. These factors were classified as patient related, system related, disease and treatment related, and cultural and religious beliefs related factors. The dependent variable was the non-adherence to ARV medicines.

3.3 RESEARCH METHODOLOGY

According to Polit and Beck (2012:12), a research method is a technique used by researchers to structure a study, to collect information relevant to the research questions and analyse it. Under the research methodology the researcher explained what was the population and sampling of this study, sampling method used, size of sample, the context, data collection procedures and how data was analysed.

3.3.1 Population and sampling

This subsection of the chapter explains the population, target population, sampling procedures and the ethical considerations observed during sampling.

3.3.1.1 Population

Polit and Beck (2012:59) described population as, “all the individuals or objects with common, defining characteristics.” In this study, the population referred to HIV positive adults receiving HIV care at a hospital in Namibia. In January 2015 the total number of adults receiving HIV care at the hospital was 3568. This number included those receiving ARV (1289) and those not yet on ARVs (2279).

3.3.1.1.1 Target population

Babbie (2009:89) defines target population as a complete set of persons or objects which possesses some common characteristics of interest to the researcher. In this study the target population were HIV positive adults 21 years and older on anti-retroviral treatment at the study site located in a hospital in Namibia. According to the EPMS by the end of December 2014, the facility ART register had a total number of 1289 adult patients on ARV treatment. Of the 1289 patients who were on ARV treatment, 933 patients came to

the hospital for their follow-up care and ARV refill in the period of October to December 2014. All 933 patients that came to the facility were all assessed for adherence to their ARV medication. The outcome was that 439 (47%) were assessed as being non-adherent to their ARVs. Therefore the the estimate population of non-adherent adult patients was 439.

3.3.1.2 Sampling

Bless, Smith and Sithole (2013:161) define sampling as a technical accounting device to rationalise the collection of information, to choose an appropriate way in which to restrict the set of objects, persons or events from which the actual information will be drawn. Polit and Beck (2012:59) describe sampling as the process of selecting cases to represent an entire population so that inferences about the population may be made. According to Bless et al (2013:163), the main advantages of sampling include; less time consuming, less costly, and the fact that sometimes sampling maybe the only practical method, when the population is too large.

3.3.1.2.1 Sampling plan

A sampling plan specifies how the sample will be selected and recruited and how many subjects it will be (Polit & Beck 2012:59). Four steps should be followed when a quantitative researcher is sampling; identify the population, specify the eligibility criteria, specify the sampling plan and then recruit the sample (Polit & Beck 2012:286). The researcher followed these steps as follows:

- *Identify the population:* In this study the researcher identified the population as HIV positive adults on Anti-retroviral treatment, 21 years and older at the study site. In January 2015 this population was 1289 adults.
- *Specify the eligibility criteria:* To be a respondents, the individual had to be aged 21 years and above, receiving ARV treatment and care at the selected hospital for a minimum duration of 3 months and non-adherent to the medicines. All persons less than 21 years old, on ARV treatment for less than 3 months and adherent to medicines were excluded in the research.

3.3.1.2.2 *Sampling method*

Census and multi-stage sampling method was used in this study.

A census is a survey covering an entire community (Polit & Beck 2012:275). All patients who attended the ARV clinic during the data collection period became part of the entire community of the HIV positive patients receiving care at the facility. All the members in this census could later be part of the study if they were eligible and consenting to be respondents.

Multi-stage sampling is a sampling strategy that proceeds through a set of stages from larger to smaller sampling unit (Polit & Beck 2012:275). Possible respondents were to be selected in successive steps. It has been documented that approaching of possible respondents is increasingly an important issue in sampling. There are mixed views about the appropriateness of approaching someone in the waiting room (Bedford, Wilson & Ritchie 2015:87). Firstly the Principal investigator and data collectors were stationed at the study site and approached possible respondents for participation in the study during individualised service in the ARV pill count room. The researcher worked together with the lay counsellors in the ARV clinic to identify possible respondents meeting eligibility criteria.

Two methods were used to identify respondents. The principal method used to identify patients with non-adherence was according to the pill count in the pill count room. Lay counsellors did pill count in a private room and documented it before the registered nurse reviewed the patient for the follow-up care. The researcher was situated in the pill count room together with the lay counsellor. In this private room the counsellors counted remaining ARV tablets as a method of assessing individual patient adherence.

In this multistage sampling, all patients who were on single dose ARV regimens and had missed more than 1 dose in a period of 30 days were assessed as non-adherent. Secondly patients on two doses per day ART regimens who had missed more than 3 doses in a period of 30 days were also assessed as non-adherent. Both of the above stated two groups of patients adherence scores were below required 95% therefore regarded as non-adherent.

From the pill count room the researcher identified patients meeting the inclusion criteria. The researcher again went through the information brochure with the individual patient and requested for the patient participation in the study.

The second method of identifying non-adherent patients was through review of patient records, that is all patients who on their last visit to the ARV clinic had adherence score of less than 95% documented in their patient care booklet (PCB). The researcher then individually contacted the patients telephonically if they would want to participate in the research. This second method of identifying respondents was meant to supplement those identified during clinic visits as they were not enough to make the required sample size.

Lastly but very important , respondents who verbally consented also signed the written consent form and their names, home address, convenient time for interviewing was recorded down for the interview to be done later at the patients homes. However, most respondents preferred to have the interview done in a private room at the clinic. Most respondents were uncomfortable with meeting data collectors at their homes or any other alternative place. Altogether 112 adults gave a written consent to participate in the study and they made up the study sample of this study.

- *Achieving the required sample size*

The study adopted the influential factors in making a research enjoyable, convenient and non-threatening to respondents (Polit & Beck 2012:287).

Predominantly the researcher approached possible respondents face to face than by telephone call but did not use letters or emails. A few respondents were approached telephonically for the sample size to be met.

The data collectors were very courteous, pleasant and enthusiastic about the study which helped in recruiting the required sample size.

Data collectors did not force patients to become respondents but they were patient to come back later if patient wished so.

Data collectors provided detailed explanation on the benefits of the study and possible patient outcomes to the community and respondents. This is believed to have helped in better recruitment of respondents.

The study had endorsement by the senior medical officer in charge of the hospital and sister in charge of the clinic which gave prospective respondents confidence in participating in the research.

Prospective participants were given assurance that their information was confidentially kept.

3.3.1.3 Ethical issues related to sampling

To ensure that during this research ethical aspects were observed, the study strictly adhered to the following basic principles in its sampling:

3.3.1.3.1 Principle of respect to persons

Payne and Payne (2006:206) advocate that a researcher should always be aware of the right to autonomy that every human being has. Thus participation in this research was purely voluntary and individuals were not penalised or prejudiced for their decisions. Respondents who opted to participate in this research had a right to withdraw at any time in the study. The respondents had freedom from coercion of any nature. No incentives were given in this study to prevent financial coercion. Polit and Beck (2012:154) re-iterate on the importance of self-determination where it is the respondents' voluntarily decision to take part in the research without risk of prejudicial treatment. These authors further underline the crucial component of the right to full disclosure. Full disclosure means the researcher fully described the nature of the investigation, client's right to refuse participation, and the researcher's responsibility, as well as possible risks and benefits.

3.3.1.3.2 Principle of justice

This is the broad principle of the Belmont report which focuses on two important aspects, right to fair treatment and right to privacy.

- *Right to fair treatment*

Respondents were selected based on study requirements not vulnerability. Requirements included adults on ARV treatment at the selected hospital and on treatment for a minimum of 3 months consecutively. Fair treatment principle also require that researchers treat people who decline to participate in a non-prejudicial manner (Polit & Beck 2012:155).

3.3.1.4 Sample

A sample is a subset of the whole population which is actually investigated by the researcher and in the case of quantitative research whose characteristics will be generalised to the entire population (Bless et al 2013:162). Jane and Jane (2009:157) define a sample as a subset of the population that is selected to represent the population.

Polit and Beck (2012:422) point out that to determine a sample size a procedure called power analysis should be done.

- *Power analysis*

The four components of power analysis are significance criterion (α), sample size (N), effect size (ES) and power (Polit & Beck 2012:422). Significance criterion states that all things being equal the more the stringent the study critereon the lower the power. As sample size increases the power increases. The effect size is an estimate of the strength of the relationship between dependent and independent variable.

The following values were used to calculate sample size. Population (N) of 134 non-adherent adults, 95% confidence interval significance level of 0.05, an expected frequency of 0.47 which was from the problem statement of 47% of adults receiving ARV treatment at the study site in the last quarter of 2014 were non-adherent and a power level of 0.8. The values were computed into an electronic sample size calulator (Raosoft 2004). The required minimum sample size was calculated to be 100. In order to be able to discuss the study findings in terms of percentages, a minimum of 100 participants are recommnended (UNISA 2015:87). Therefore the minimum sample size for the study was 100. However twelve more participants volunteered to participate and the final number of participants for the study was 112.

3.3.1.4.1 *Factors which affected the sample size of the study*

- *Effect size*

This is the strength of relationships among research variables (Polit & Beck 2012:285). In this study the dependent variable was non-adherence and the independent variable were the factors associated with non-adherence. The researcher expected a moderate to strong relationship to exist between non-adherence and the associated factors, consequently a relatively small sample was considered adequate to reveal the relationship statistically. Polit and Beck (2012:285) proposed that if there is a reason to expect independent and dependent variables to be strongly related then a relatively smaller sample maybe enough to statistically ascertain the relationship between variables.

- *Homogeneity of the population*

If the population is generally homogenous then a small sample may be adequate (Polit & Beck 2012:285). Furthermore, the larger the variance of the variable the larger the sample required. In this study there were vast variation of the rate of non-adherence among the respondents. All adults who had an adherence score less than 95% were classified as non-adherent such that the variance from 0-94% was wide posing the need for a larger sample in this study. This determinant of sample size required the sample to be large.

- *Cooperation and attrition*

According to Polit and Beck (2012:285), researchers should expect some degree of respondent loss and thus should recruit accordingly. They point out that not everyone invited in a study will agree to participate. After the required sample size had been ascertained, the study issued out 12 questionnaires to cater for dropouts and incomplete questionnaires.

- *Subgroups analysis*

Respondents in this study were non-adherent adults 21 years or older, who were on ARVs for a minimum of 3 months at the Hospital. The wide age range as well as wide variation in duration on ARVs required the sample size of this study to be relatively large for it to represent the population well.

- *Sensitivity of the measures*

Polit and Beck (2012:286) warn researchers that if measuring tools are imprecise and prone to errors, then such researchers should make their samples larger in order to adequately test hypothesis. The researcher of this study maximally ensured the validity and reliability of the instrument, pre-tested it to ascertain that the tool was precise and not susceptible to errors. This allowed the sample size in this study to be relatively smaller yet still adequate to provide representation of the population.

3.3.1.4.2 Size of the population (N)

In this study the number of adult ARV patients who had non-adherence in the quarter of October to December 2014 was 403 giving an average of 134 non-adherent adult patients per month. As a result, population size for the study was estimated at 134.

3.3.2 Data collection

3.3.2.1 Data collection approach and method

The data collection approach chosen was that of structured interviews supplemented with review of records method. Bell and Waters (2014:282) define a structured interview as a standardised interview which is a quantitative research method with the aim that each interview is conducted with exactly the same questions in the same order across respondents. Patient data was collected using patient responses during interview and patient records. The patients who were identified as non-adherent from the pill count room, and who verbally consented to participate in the research, after signing the consent form formed the sample. These respondents informed the researchers on the times they preferred to be interviewed at their convenience of which the majority opted to be

interviewed in private room at the clinic.. Joubert and Ehrlich (2007:108) also agreed that structured interviews follow a clearly structured format which prevents interviewer from interpreting questions in their own way. Joubert and Ehrlich (2007:108) further point out that the advantage of structured interviews is that it allows standardisation and increases reliability of information obtained.

Bless et al (2013:76) describe structured interviews as having the following characteristics; uses an interview schedule like a questionnaire in which the researcher uses a list of set questions on every respondent, the interview schedule is designed and piloted well before main interview with respondents.

Advantage of structured interview allows the researcher to organise and analyse his/her findings relatively easily. Other advantages of structured interviews also include higher response and quality information as compared to other methods like telephonic or postal interviews. Furthermore, in structured interviews same questions are used in same order making it is easier to compare responses from one subject to the other. Disadvantages of structured interviews are that they do not allow scope for in-depth interviewing which means researcher cannot follow-up subsequent questions, for example, if researcher wants to find out why people feel the way they do (Bless et al 2013:76). Secondly by its design, structured interviews cannot cater for spontaneous responses from respondents, for example, off the cuff responses that respondents may want to offer during the interview. Other disadvantages include its time consuming, expensive, and the fact that physical confrontation may interfere with data (Joubert & Ehrlich 2007:108).

To reach the required sample size the principal investigator and data collectors identified possible respondents from the review of patient data as per their patient care booklet (PCB). Respondents' clinical records were accessed to access data about individual patient and the data was recorded on a check list which correlated with the questionnaire. Review of records is known to be quick and cost effective, allows historical comparison and data cannot be influenced by the researcher. However, reviewing records has challenges of incomplete data and data being recorded by different people (Joubert & Ehrlich 2007:108). Records have adherence and/or non-adherence history of the individual patient which was important to the researcher. Further information reviewed in the records included the attendances of appointments dates, adherence assessment scores where non-adherence are identified, ARV regimen of the particular patient,

duration on ARV treatment, and blood results of patients including viral load. The researcher used both the electronic patient monitoring system (EPMS) and paper based data to document patient data.

3.3.2.2 Development and testing of the data collection instrument

As per data from literature review following the conceptual framework of factors influencing non-adherence of individuals, a structured questionnaire was compiled firstly in the English language (see Annexure G). Some questions were compiled based on findings from literature reviewed on factors associated with non-adherence while others were derived from the Namibia HIV patient care booklet (PCB) in which patient information is entered on every follow-up visit to the clinic. One medical officer, two nurses, one pharmacist and one lay counsellor all of who had experience of working in the ARV clinic gave assistance in the development of the questionnaire. Phrasing of some questions was adopted from the tools used in two different studies in Ethiopia by Tsega, Srikanth and Shewamene (2015:375) and Abdissa (2013:60). Finally as this was a quantitative research, a statistician finalised the questionnaire. When the English questionnaire was ready, the researcher employed language experts, in the form of secondary level subject teachers from the Namibian Ministry of Education, Arts and Culture, to translate the English questionnaire into Afrikaans (Annexure I) and Oshiwambo (Annexure H) which were among the common languages that are widely spoken by the respondents.

The subsections of the questionnaire were as follows:

Section 1: Socio-demographic and socio-economic. The first section of the questionnaire had a set of 8 questions which collected information on socio-demographic information of the respondent. These included age, sex, race, preferred language, marital status, level of education and employment status.

Section 2: Patient-related factors. This comprised of 6 questions seeking to understand individual markers in a patient that could be associated with non-adherence. Questions focussed on duration on ARV therapy, emotional status, alcohol consumption and forgetting to take ARVs.

Section 3: System-related factors. A set of 8 questions which focused on healthcare delivery system and patient perceptions of it. The focus here was on service system operating hours, professional relationships, distance of clinic from patient's residence and pharmacy stock outs.

Section 4: Disease- and treatment-related factors. Six question were employed to elicit data about the HIV/AIDS disease and the ARV treatment of the respondent. This part of the questionnaire asked on side effects of ARVs on the patient, dose of ARVs and health status of the patient.

Section 5: Cultural and religious factors that could be related non-adherence. Questions explored whether taking ARVs offended patient's cultural and religious beliefs and if the patient believed HIV could be treated by religious or cultural methods.

The questionnaire was piloted on 10% (10 respondents) of the sample size. Changes were made on the questionnaire from the feedback given during piloting. Polit and Beck (2012:195) describe that piloting is a trial run or small scale version of the study which is meant to test the proposed methods before they are used at a larger scale. Among other things, this helped the researcher to determine required time for the interview. Average time taken to conduct the interview was 10-15 minutes. Pre-testing also granted an opportunity to identify vague questions in the questionnaire which respondents could not clearly understand. Some questions which were found repetitive where removed from the questionnaire. Other changes included some questions being removed as they were too long and terms were changed to make it easier for participants to clearly understand.

3.3.2.3 Characteristics of the data collection instrument

According to Jourbert and Ehrlich (2007:107), a questionnaire is a list of questions which are answered by a respondent and which give indirect measures of the variables under investigation. Bless et al (2013:82) notes that there are 3 types of questionnaire.

1. Attitudinal questions which gather data on how people think, feel or behave and it can be scored.
2. Gather information which report on particular things e.g. yes or no and tick boxes. Such questions cannot be scored.

3. Mixed questionnaires which have both attitudinal and gather information questions.

Some questionnaires like the one in this study used both attitudinal and gathering data questions. The study questionnaire was predominantly attitudinal as it asked respondents on how they think, feel and behave and they could be scored. It also had questions which simply gathered data by ticking boxes. The questions were structured because they were predetermined, definite and they followed the same order for all respondents. The researcher did not construct new questions during data collection as all questions were prepared in advance including the possible responses.

3.3.2.4 Data collection process

After securing ethical clearance (Annexure A) with the UNISA Department of Health Studies, an approval (Annexure B) with the Namibia Ministry of Health and Social Services Research Committee was applied for and approval was granted as shown in Annexure C. A letter for permission to collect data from the study site was also submitted to the senior medical officer of the hospital and the sister in charge of the ARV clinic (see annexures for approval letters and application letters to the hospital senior medical officer and sister-in-charge). In all cases permission was granted.

The principal investigator identified three data collectors but only two were available during data collection. Both were third year nursing students. The principal investigator used assessments of students from their progress files to confirm their professional conduct and academic performance. This was also supported with students' evaluation feedback from clinical area and lecturers' feedback on the two students. This background helped the researcher to train them on ethically and academically sound data collection. The two data collectors were comfortable in using all the three languages on the questionnaires, English, Afrikaans and Oshiwambo. The data collectors underwent two days training, on 27 and 28 July 2016, conducted the principal researcher on data collection using the three questionnaires. Training emphasised on the four principles of ethical considerations and how to prevent bias. The data collectors also signed a confidentiality binding form (see Annexure D). Data collection commenced on the 3rd of August 2016.

All respondents who gave verbal and written consent agreed with the data collectors on comfortable time and place for data collection to occur. The consent form is depicted in Annexure E. Noteworthy, most respondents were not comfortable with data collectors coming to their homes and instead preferred for the interview to be done at the clinic in a private room. About 73.3% (n=82) of respondents were interviewed at the clinic while 26.7% were interviewed at places of their choice other than the clinic. Each respondent's interview took approximately 10-15 minutes.

3.3.2.5 Ethical issues related to data collection

Firstly, permission to carry out the study was requested from the UNISA Department of Health Studies. When the ethical clearance had been provided (see Annexure A), approval was also sought from the Namibia Health Research Ethics Committee (See Annexure B). Approval to conduct study was granted by the Namibia Health Research Ethics Committee (see annexure C). Then application was submitted to the senior medical officer of the selected Hospital and the sister-in-charge of the ARV clinic requesting permission to conduct the study at the particular site. The study site authorities gave verbal approval for data collection of the study. Individual patients volunteered to participate in this research. Verbal consent was sought from patient after which the patient signed a consent form agreeing to participate in the study (see Annexure F).

3.3.2.5.1 Principle of beneficence

Polit and Beck (2012:152) state that beneficence imposes a duty on researchers to minimise harm and maximise benefits. They are of the opinion that researchers have an obligation to avoid, prevent or minimise harm to respondents. Questions were structured to collect precise data yet not causing emotional harm or distress to the respondents. Respondents did not incur costs as a result of their participation in this study. Polit and Beck (2012:152) says that protection of respondents should be holistic so as to ensure freedom from discomfort or harm physically, spiritually, emotionally, economically, socially and legally. Questions and interviews were also structured in a way not to undermine patient's spiritual, cultural or social beliefs. Respondents were free not to answer questions they felt uncomfortable to answer. As Polit and Beck (2012:153) note, protecting respondents from physical harm is straightforward but psychological consequences may be subtle hence calling for closer attention. There was no covert data

collection, meaning no data was collected without patient knowledge and consent. The researcher and data collectors pledged that they would not be deception prior to commencement of the study. All necessary information relating to the study was provided to the respondents.

3.3.2.5.2 Privacy and confidentiality

To maintain privacy, patients were only approached to participate in this research in the pill count room where there was privacy and individualised care. Patients who agreed to participate in the research were interviewed in private at a place most convenient to the respondents. Information collected during data collection was kept in strict confidentiality. Both paper based and electronic based data did not have any markers which could identify the respondents. Data collectors signed confidentiality forms which bound them to maintain strict confidentiality concerning all information gathered during this study.

3.3.3 Data analysis

Completed paper questionnaires were kept in a locked secure place which only the principle researcher could access. Before electronic data capturing, data cleaning and coding was done. Coding is the process of transforming data into symbols often numbers (Polit & Beck 2012:473). Electronic data collected for this study was kept in a password protected computer. Only the principal research had access to this computer. The services of a statistician were also employed. Data was entered into a computer package called Statistical Package for Social Sciences (SPSS version 20). Analysis was by descriptive statistics. Descriptive statistics describe and summarise data using means and percentages while inferential statistics permits inferences to be made about whether results observed in the sample can be generalised to the larger population (Polit & Beck 2012:725). Measures of association between exposure and outcome are used to summarise information gathered in a study (Joubert & Ehrlich 2007:148). Exposure for this study referred to factors associated with non-adherence and the outcome was non-adherence. In this study descriptive methods were used to evaluate association.

3.4 INTERNAL AND EXTERNAL VALIDITY OF THE STUDY

Validity is the design of research to provide credible conclusions; whether the evidence can bear the weight of the interpretation put on it (Sapford & Jupp 2006:1). Joubert and Ehrlich (2007:117) note that validity describes the extent to which the measurement instrument measures what it is intended to measure. Validity can be internal or external.

Internal validity is the extent to which changes in the dependent variable are indeed due to the independent variable (De Vos et al 2011:153). Internal validity allows researcher to answer the research question convincingly (Bless et al 2013:157).

External validity is the degree to which results can be generalised (De Vos et al 2011:153). External validity refers to what extent the results obtained in this study apply to the population being studied and to other contexts different from those of this specific study (Bless et al 2013:157). To ensure external validity the principal investigator and data collectors had to act in a way which did not interfere with results (De Vos et al 2011:155).

According to Polit and Beck (2012:336), the four important facets of validity are face validity, content, criterion related and construct related validity. Instruments can be validated using any of the four facets. In this particular study face, content and construct were used to ensure validity.

3.4.1 Face validity

Face validity refers to whether the instrument appears to be measuring the target construct (Polit & Beck 2012:336). For the face value of the questionnaire it was assessed by 5 healthcare workers trained and working in HIV care. These 5 healthcare workers were 1 medical officer, 2 registered nurses, 1 pharmacist and 1 lay counsellor. They gave their inputs and helped to make the questionnaire clear and respondent friendly yet measuring what they were intended to measure.

3.4.2 Content validity

This examines the extent to which measurement includes all the major elements relevant to the construct being measured (Burns & Grove 2011:335). This description of content validity is reiterated by Polit and Beck (2012:336) who note that content validity is the degree to which an instrument has appropriate sample items for the construct being measured and adequately covers the construct domain. The construct in this study were factors associated with non-adherence. To cover this construct the following elements were assessed; patient-related factors, socio-economic factors, disease and treatment related factors and finally cultural and religious related factors. In this study, content validity was ensured by a thorough literature review and review of the instrument by five expert healthcare workers. The instrument was reviewed against the Namibian ART guidelines by the healthcare workers which provided content and construct validity.

3.4.3 Construct validity

According to Burns and Grove (2011:335), construct validity includes content and predictive validity. It is concerned with validity of inferences from the observed persons, the settings, cause and effect relationships involved in the study and the constructs that these instances may be representing (Polit & Beck 2012:237).

3.5 RELIABILITY

Reliability is defined as the extent to which an instrument consistently measures a concept (Burns & Grove 2011:546). The same concept of consistence is re-iterated by Polit and Beck (2012:331) who describe reliability as the degree of consistence or dependability with which an instrument measures an attribute. In other words, reliability focuses on level of similarity of results obtained when the measurement is repeated could be on the same subject or group (Joubert & Ehrlich 2007:117). In this study reliability was ensured first by engaging healthcare workers involved with HIV care critiquing the instrument. The data collection tool was also translated from English to Afrikaans and Oshiwambo to ensure clear understanding and avoid misinterpretation of questions. The statistician's input provided addition information to ensure the reliability of the instrument. Pre-testing of the instrument and piloting also maximised on reliability of the instrument as feedback was inco-operated before instrument was used for this study. The commonly

used method to assess internal consistency is coefficient alpha. Previous studies which investigated factors associated with patient's ability to take ARV medicines as agreed with healthcare workers had variable reliability coefficients (Cronbach's alpha). Abdissa (2013:60) in a study on determinant factors affecting adherence the instrument yielded a Cronbach alpha of 0.75 to 0.82. A reliability coefficient of at least 0.80 for all well-developed tools and 0.70 for a newly developed tool is considered acceptable. Questions which were from previously used tools used in this study were from two different studies in Ethiopia by Tsega et al (2015:375) and Abdissa (2013:60) of which yielded alpha coefficient above 0.70.

3.6 CONCLUSION

This chapter outlined the research methods used in this study. It described the sampling methods and highlighted ethical issues related to sampling and data collection in this study. It concluded by outlining data analysis, internal and external validity. Following is chapter provides a detailed lay-out of the research findings.

CHAPTER 4

ANALYSIS, PRESENTATION AND DESCRIPTION OF THE RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter presented and discussed the research findings from the data that was collected. The overall purpose of this study was to minimise non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment.

The objectives of this study were:

- To identify non-adhering patients from the clinical visits and EPMS and to confirm with the patient care booklet.
- To determine the factors associated with non-adherence in adult patients to ARV treatment.
- To recommend to stakeholders methods to facilitate adherence in patients on ARVs

4.2 DATA MANAGEMENT AND ANALYSIS

Data collection was conducted from 3rd of August until the 7th of September 2016. The principal investigator and two trained data collectors conducted structured interviews using a questionnaire. The total number of respondents interviewed was 112 which made up the study sample. The venue for interviews depended upon individual respondent preferences. Most respondents were comfortable being interviewed in a private room at the clinic than at their homes. The questionnaires did not have any identifiers or markers and only sequential numbers were used for identification. Therefore, all the data was anonymous and was collected in strict confidentiality. Data was kept in a lockable cupboard while the electronic data was kept in a password locked computer.

Data was cleaned and entered into a database on SPSS version 20.0. Descriptive statistics were used to analyse the data. The data was presented in form of frequency distribution using bar graphs, tables, pie charts and percentages.

4.3 RESEARCH RESULTS

Data analysis was done according to objectives as outlined in chapter one.

4.3.1 Identify non-adhering patients from the clinical visits and EPMS and confirm with patient care booklet

In the period of data collection 392 adult patients on ART at the site attended the clinic for their follow-up HIV care and refill of ARV treatment. All patients who came for ARV follow-up were assessed for adherence to their medication using the pill count method. From the healthcare workers, adherence assessment using the pill count method in the pill count room, 144 patients had an adherence score of less than 95%. All the patients with adherence score of less than 95% were identified as non-adherent. Therefore the rate of non-adherence among patients at the study site in this period was found to be 36.7%. Of the 144 non-adherent patients, fourteen (14) did not meet the inclusion criteria as eight (8) were on ARV treatment for a duration of less than 3 months while six (6) were less than 21 years of age.

From 130 eligible adult patients who were approached to participate in this study, 94 consented verbally and also signed the consent to participate in the study, giving a response rate was 73%. To meet the required sample size of minimum of 100 respondents, the study needed more 6 respondents. To cater for a possible low response rate, twenty-five more non-adherent patients were identified from the EPMS and confirmed with the patient care booklet. These patients were contacted telephonically and 18 expressed willingness consent to participate in the study giving a response rate of 72%. All 18 additional patients attended the interviews which resulted in a total of 112 respondents for the study.

The non-adherence rate of 36.7% found in this study was significantly higher than that reported in a study in Northern Namibia of 22% measured by pill count (Nghoshi 2016:

ii). In another study in Ethiopia, Negash (2011:64) noted that 26.5% of the respondents had sub optimal adherence.

4.3.2 Determine the factors associated with non-adherence in adult patients to ARV treatment

The following was discussed under the subtopics of demographic sample characteristics, patient related factors, system related factors, cultural and religious factors.

4.3.2.1 Demographic sample characteristics

In this section, the research results pertaining to respondents' sex, age, ethnicity, religion, marital status, level of education, living condition, source of support and employment status were presented. The results are presented from the table over leaf.

4.3.2.1.1 Distribution of respondents by sex (N=112)

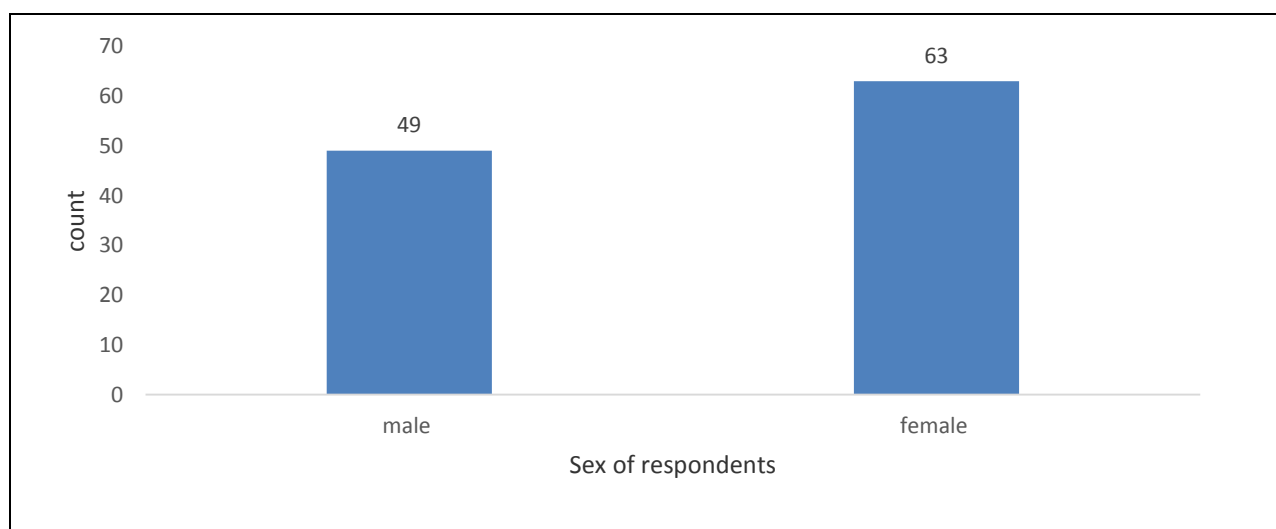


Figure 4.1 Distribution of respondents by sex

Of the 112 respondents in this study 56.3% (n=63) were women and 43.8% (n=49) were men as shown in in figure 4.1 above. This is in line with the general population of patients receiving HIV care in Namibia including at the study site where 60% of patients in HIV care are women (MoHSS 2014b:4). More females could imply that although more females attended follow-up visits for refills, female were also more non-adherent. Although the study did not compare equal number of women versus men, research findings are similar

to from other studies (Tsega et al 2015:375; Amsalu, Wanzahun, Mohammed & Tariku 2014:75). Beer et al (2012:218) concur that females tended to be more non-adherent than males. Uzochukwu et al (2009:192) also re-iterated that being female was significantly associated with non-adherence. However, some studies have yielded no significant relationship between sex and non-adherence (Abdissa 2013:65). Others showed higher incidence of non-adherence among men than women. Nghoshi (2016:29) reported an overall higher incidence of non-adherence among men than females in a study in northern Namibia.

4.3.2.1.2 Age of respondents (N=112, Total=100%)

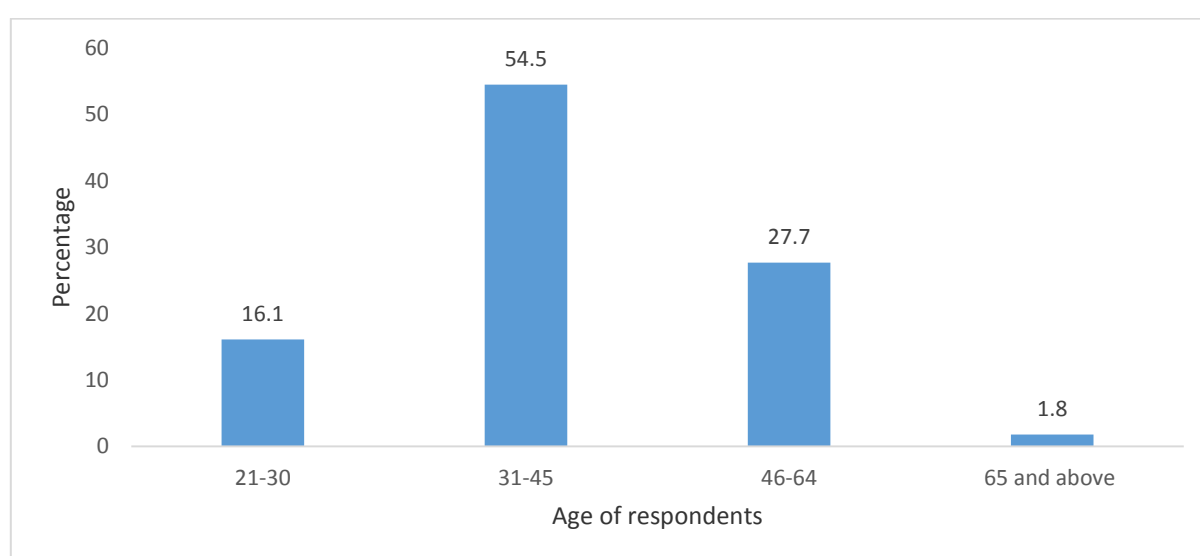


Figure 4.2 Age distribution of respondents

Respondents were classified in age groups which share similar developmental characteristics along life span. This was in line with contributions provided by the statistician. Those respondents in age group 21-30 years are young adults' who oftenly are pursuing careers and ambitions, those in age group 31-45 years mainly contribute to the working force, those in age group 46-64 years are mature adults approaching retirement and those 65 years and above make up the retired age group. Figure 4.2 above showed that the highest number of respondents were found in the age group 31 -45 (54.5%) followed by 46 -64 years (27.7%) and 21-30 years (16.1%) while the least was the above 65 years (1.8%). This concedes with findings reported by Tsega et al (2015:373) who noted that the likelihood of ART non-adherence in the age group 31–45 years and 18–30 years was 1.51 and 0.63 times that of the age group 46–64 years. The

significant association between younger age and non-adherence is further supported by Nuwagaba-Biribonwoha et al (2014: [10]) and Beer et al (2012:218). However, Abdissa (2013:65) highlighted that there was no statistically significant association between the age of respondents and their adherence in a study conducted in Ethiopia.

4.3.2.1.3 Ethnicity of respondents (N=112, Total=100%)

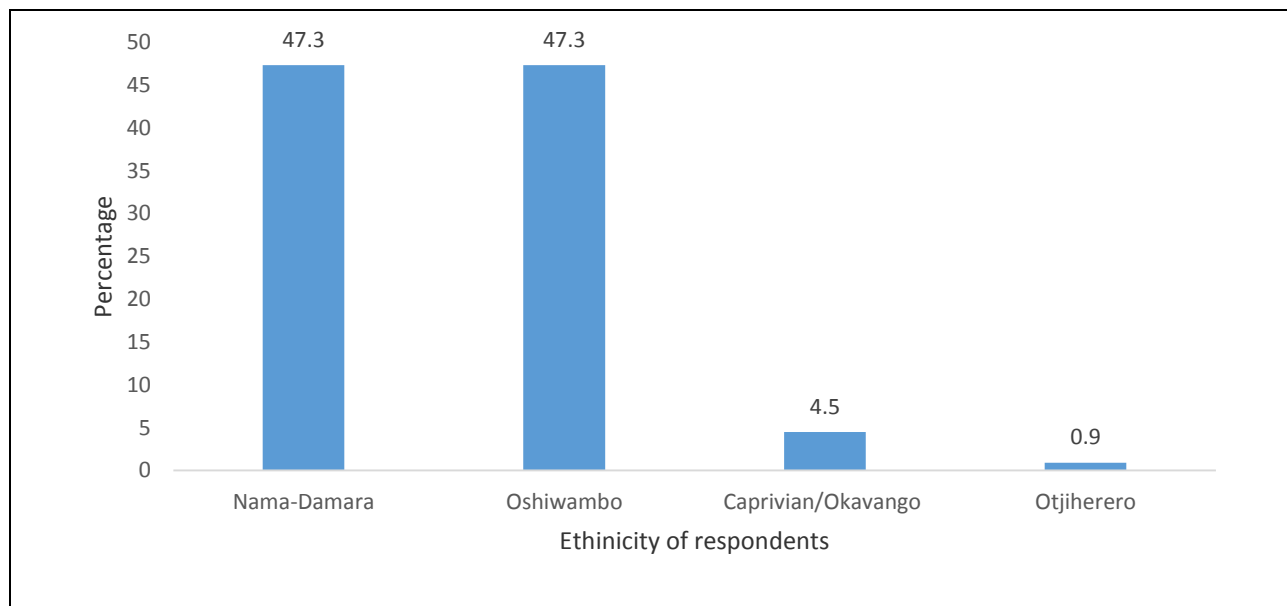


Figure 4.3 Distribution of respondents by ethnicity

Figure 4.3 above shows that the study sample had equal numbers of Oshiwambo (47.3%) and Nama-Damara (47.3%) respondents while 4.7% were Caprivians and Okavango and only 0.9% were Otjiherero. As study site is located in Southern Namibia, the Nama-Damara ethnic group predominates. According to the Namibia Demographic Health Survey, 56% of the population speak Oshiwambo, 13% speak Damara/Nama, while about 10% speak Afrikaans, 10% Herero and 10% Kwangali (MoHSS 2013a:7). Previous studies conducted on adherence in Namibia are silent on the relationship between ethnicity and level of adherence to ARV treatment. In view of this observation, respondents at the study site were not equally distributed across ethnic groups. Noteworthy, this study may not conclude that specific ethnic groups are more non-adherent than others.

4.3.2.1.4 Religion of respondents (N=112)

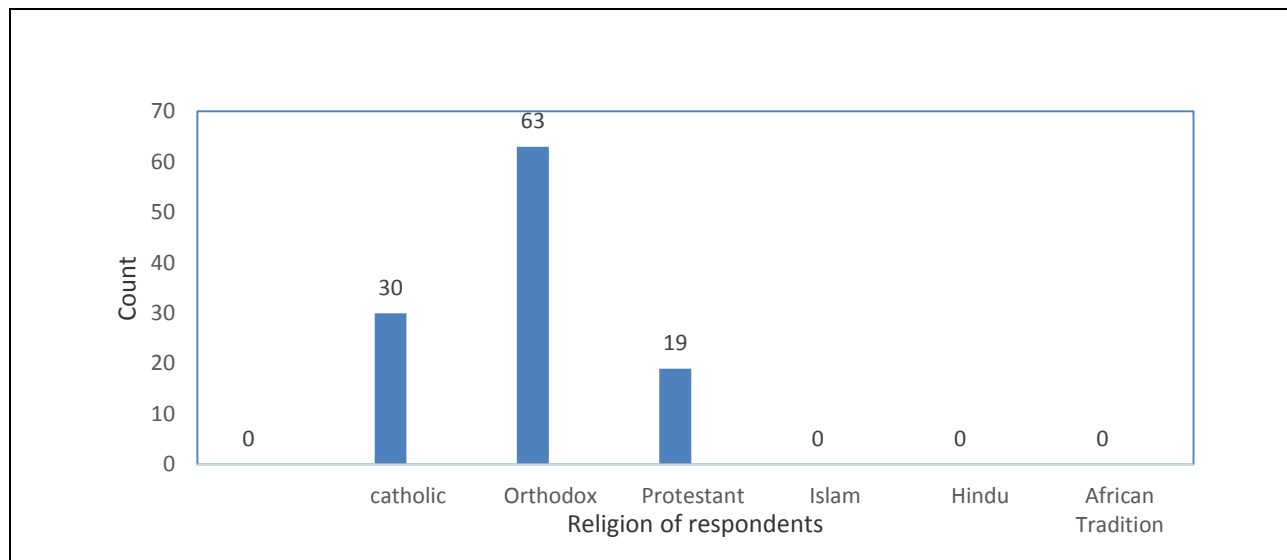


Figure 4.4 Distribution of respondents by religion

Figure 4.4 above depicts the distribution of respondents by religion. Catholics were 26.8% (n=30), Orthodox were 56.3% (n=63) while the remainder of 17% were Protestant. None were from the Islam, neither Hindu nor the African traditional religions. The 2013 DHS (MoHSS 2013a:23) highlighted that 44% of the population belong to the Evangelical Lutheran Church of Namibia which is Orthodox, 13% were Protestant and approximately 26% were Roman Catholic. While the analysis showed general distribution of the various religious groups in this geographical location, this does not imply that respondents who were orthodox were most non-adherent. Other studies did not also yield any statistical significance between religion and level of adherence (Abdissa 2013:73; De & Dalui 2012:251).

4.3.2.1.5 Marital status (N=112)

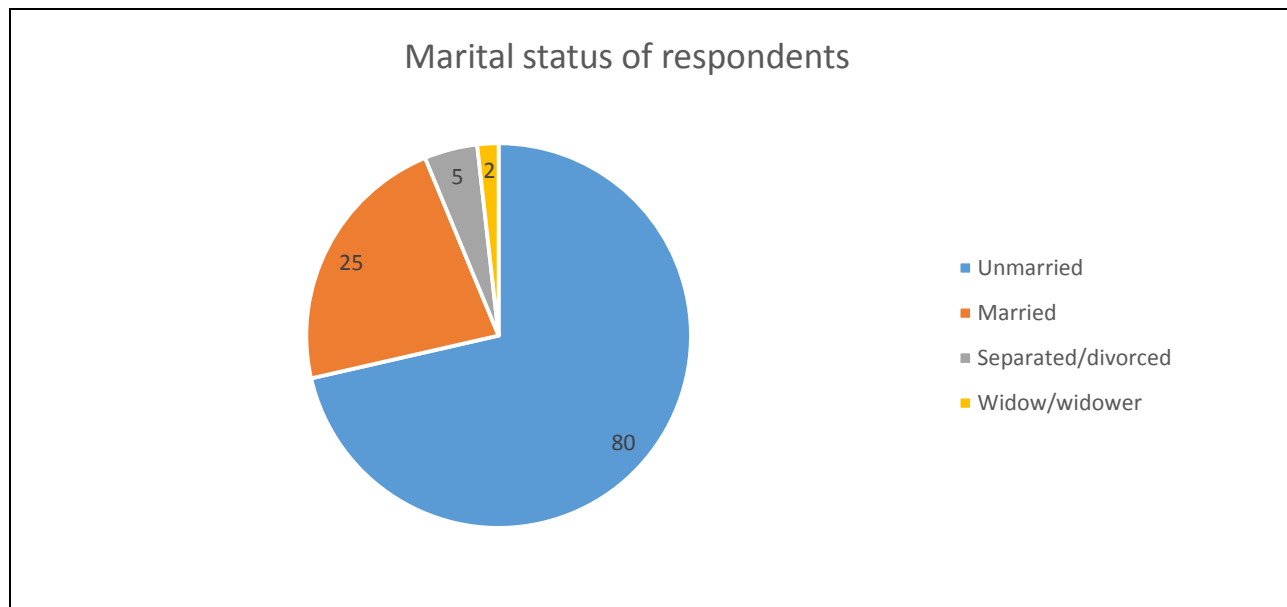


Figure 4.5 Respondents marital status

As outlined in figure 4.5 above, the majority of the respondents 71.4% (n=80) were unmarried, 22.3% (n=25) were married while the remainder was either separated/divorced (4.5%) or widowed (1.8%). According the DHS of 2013, approximately only 15-18% of Namibian adults are married (MoHSS 2013a:7). Findings of unmarried people being more non-adherent have also been reported in Zambia (Sasaki, Kakimoto, and Dube et al 2012:11). Elsewhere, association between marital status and adherence levels were not established (Abdissa 2013:70; Negash 2011:67).

4.3.2.1.6 Level of education of respondents (N=112, Total=100%)

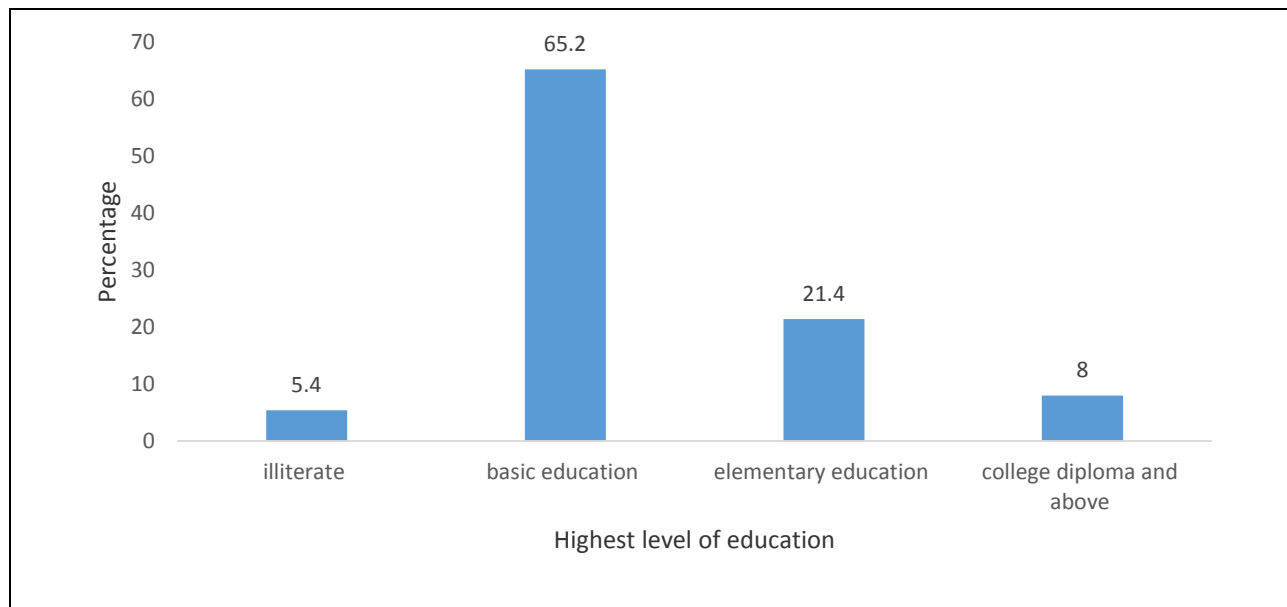


Figure 4.6 Respondents highest level of education

Figure 4.6 presented highest level of education. The results showed that most of the non-adherent respondents had only attained basic education or less. The majority (65.2%) of respondents had attained only basic level basic education, 21.4% (n=24) had elementary education, 8% had a diploma or higher qualification while 5.4% were illiterate. These findings are consistent with the general education status in Namibia where only 10% of adults have received higher than secondary education and about 8% have never attended school (MoHSS 2013a:7). The relationship between low education status and non-adherence have been documented before (Campos, Guimarães & Remien 2010:293; Muessig et al 2014:988). However, some studies did not yield any association between education level and adherence levels. (Negash 2009:51; Abdissa 2013:71).

4.3.2.1.7 Respondents living condition (N=112, Total=100%)

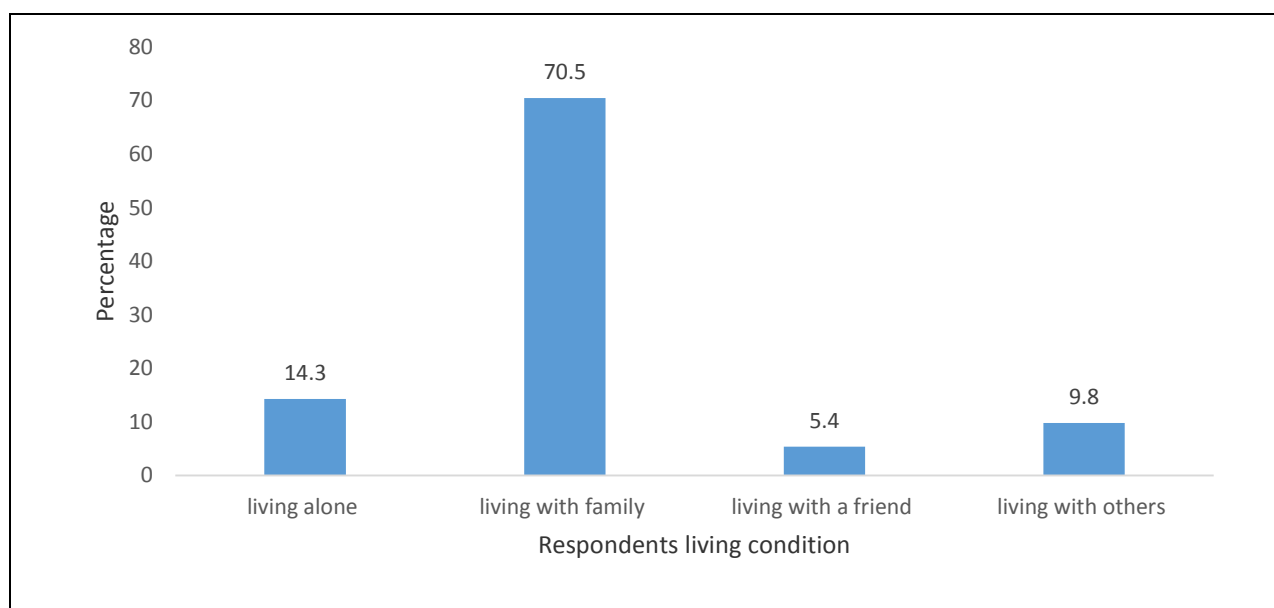


Figure 4.7 Living conditions of the respondents

Figure 4.7 depicted the living conditions of the respondents. The majority of the respondents 70.5% (n=79) were living with family, 14.3% lived alone, 9.8% were living with others while the remaining 5.4% lived with a friend.

4.3.2.1.8 Respondents source of support

Table 4.1 Distribution of respondents by source of support (N=112, Total=100%)

Source of support	Frequency	Percentage
Self-support	65	58.0
Families	36	32.1
NGOs	7	6.3
No support	4	3.6
Total	112	100.0

Table 4.1 above shows the source of support of the respondents. 58% (n=65) of the respondents were self-supporting, 32% received support from family, 6.3% received support through donor-funded groups and notably only 3.4% of respondents had no support at all. Although 70.5% of respondents lived with their family, only 32% received support from family. Abdissa (2013:112) noted that there was a significant association

between availability of social support in taking ARV treatment and adherence to treatment. In Thailand, Li et al (2010:212) highlighted that poor family communication was associated with non-adherence. Seven (4.9%) respondents attributed lack of food for not taking their ARVs while another 7 (4.9%) respondents reported that they did not have taxi money to come to the clinic as their reasons for non-adherence.

4.3.2.1.9 Respondents employment status (N=112, Total=100%)

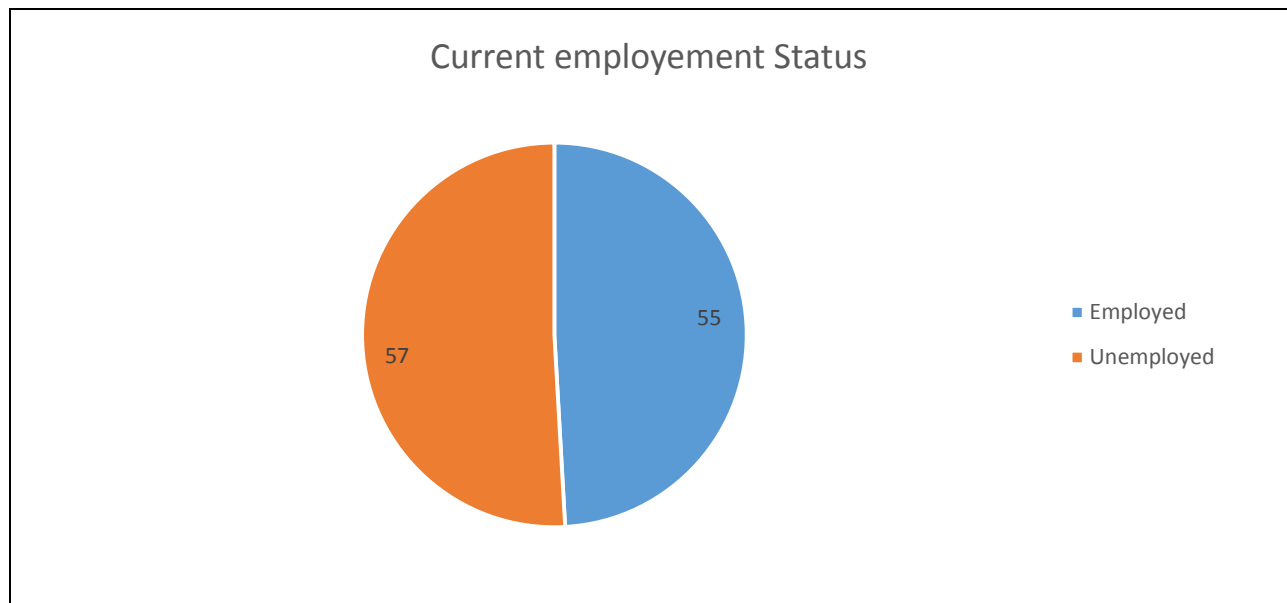


Figure 4.8 Employment status of the respondents

As shown in figure 4.8, 49.1% of the sample was employed while the remaining 50.9% was unemployed. In this study, both employment and its lack therefore were observed to contribute to non-adherence. Some respondents highlighted that work commitments kept them busy and contribute to them missing ARV doses. Notably, 7(4.9%) respondents indicated having not got time off work to take their ARVs. In Ethiopia, one study reported that the likelihood of ART non-adherence in employed patients was 0.41 times that of the unemployed patients (Tsega et al 2015:376). Nghoshi (2016:39), however, noted that employed respondents had a higher rate of adherence compared to pensioners and unemployed respondents combined in a study in Northern Namibia.

4.3.2.2 Patient related factors

This subsection presented study outcomes on aspects that pertain to the patients themselves. These included respondents' beliefs in ART, community disclosure, use of active substances, patient emotional status and whether taking ARVs reminded the respondents of the HIV infection.

4.3.2.2.1 Respondents responses on ART is essential for HIV patient (N=112)

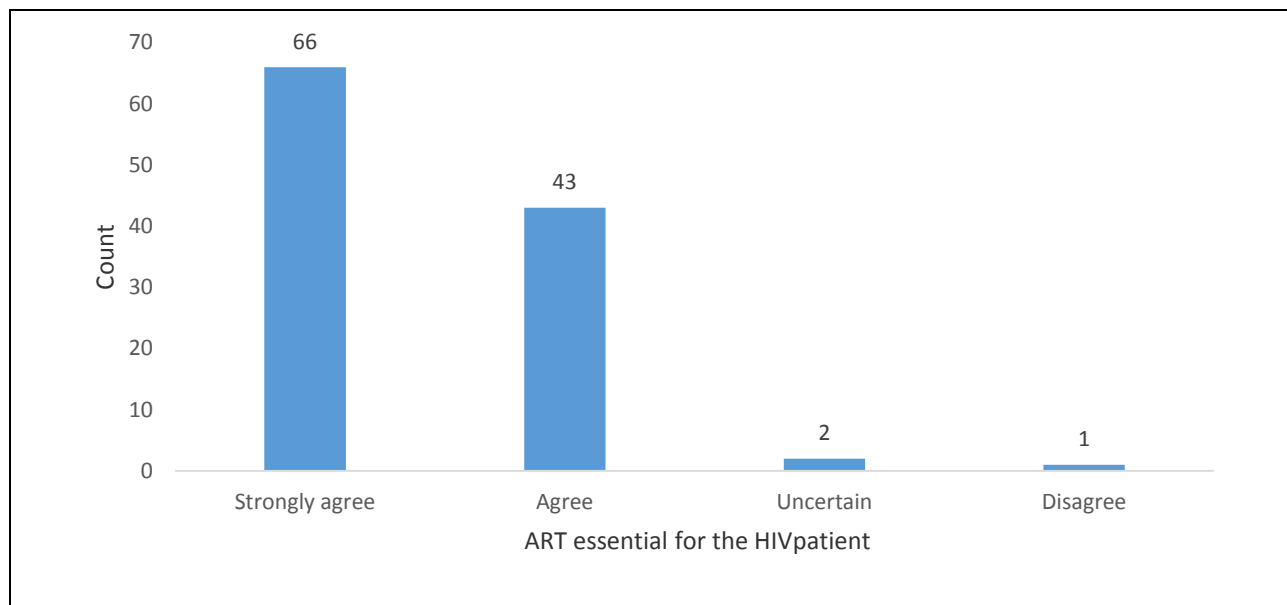


Figure 4.9 Respondents responses to ART is essential for the HIV patient

Majority of the respondents, 58.9% (n=66), strongly agreed that ART is essential for the HIV patient, 38.4% simply agreed while only 1.8% were uncertain and 1 (0.9%) respondent disagreed. 97.3% of respondents either strongly agreed and agreed that ART is essential for their care. This result suggested that although respondents were non-adherent to their medicines, they were aware ART was vital in HIV care. This may be an indication of the importance of successful health education on the importance of ART treatment to patients. Similar findings have been reported were approximately 97% respondents agreed and strongly agreed that the use of ART was essential to their life (Tsega et al 2015:376). Other studies have also reported that poor beliefs in the benefits of ARVs were associated with non-adherence (Gari et al 2013:7).

4.3.2.2.2 Respondents comfort in taking ART in the presence of others (N=112, Total=100%)

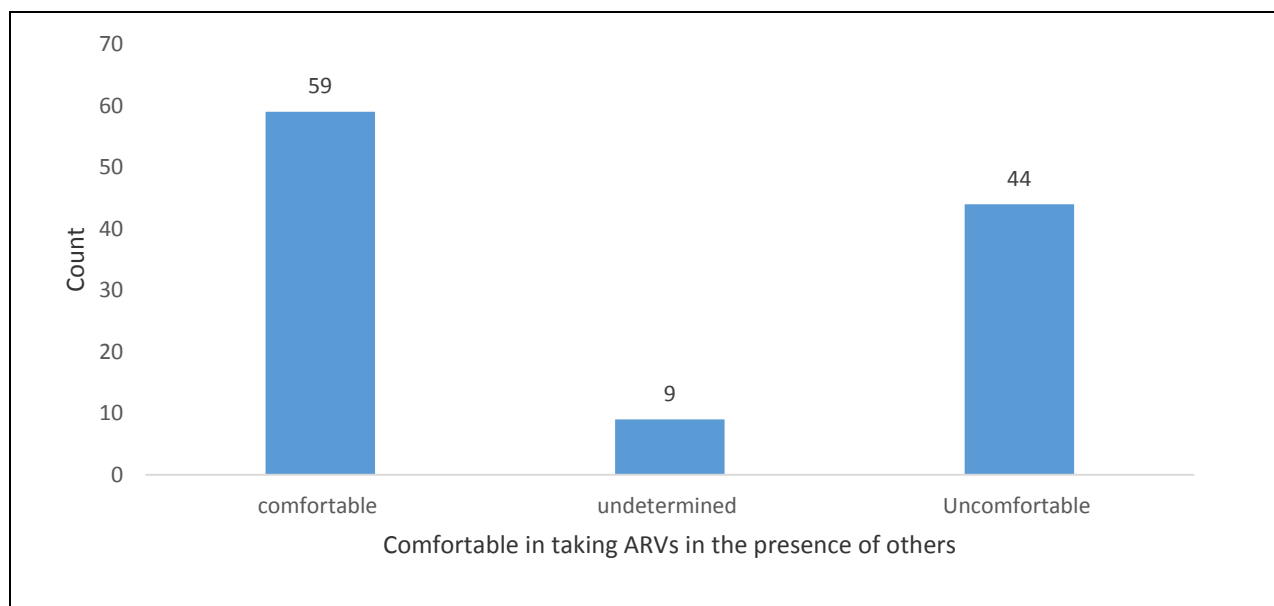


Figure 4.10 Comfort of respondents in taking ARVs in the presence of others

Approximately 52.7% (n=59) respondents were comfortable taking their ARV treatment in the presence of others, while 9 (8%) were undetermined as depicted in figure 4.9 above. Only 39.3% (n=44) expressed discomfort with taking ARVs in the presence of others. The study findings revealed that patients sometimes miss their doses because of discomfort with taking ARVs in the presence of others.

4.3.2.2.3 Respondents use of active substances (N=112)

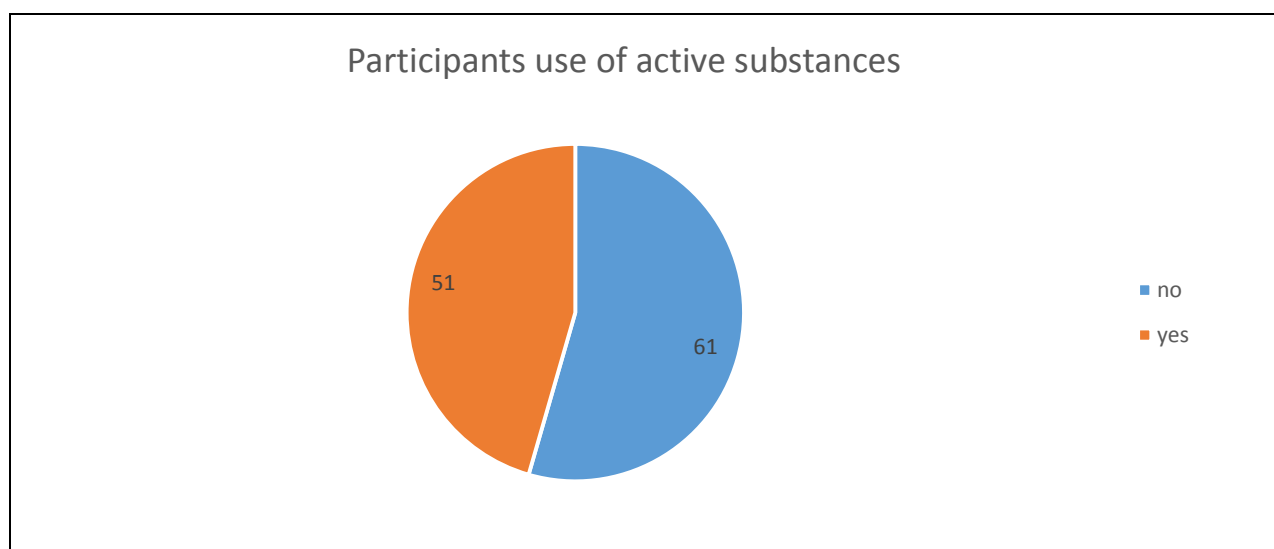


Figure 4.11 Distribution of respondents by use of active substances

In this study, 45.5% (n=51) of respondents were using active substances while the remainder 54.5% (n=61) were non-users. Among the respondents using active substances, 22(43%) cited alcohol use as the reason for missed doses. The number of respondents using active substances in this study was double that reported in Ethiopia where only 22.5% respondents were active substance users (Tsega et al 2015:375). These results suggest that active substance use may contribute to non-adherence. The association between active substance use and non-adherence were also documented in America, South Africa and Ethiopia respectively (Beer et al 2012:220; Kip et al 2009:149; Negash 2011:69).

4.3.2.2.4 Respondents frequency in use of active substances in the past one month (N=112)

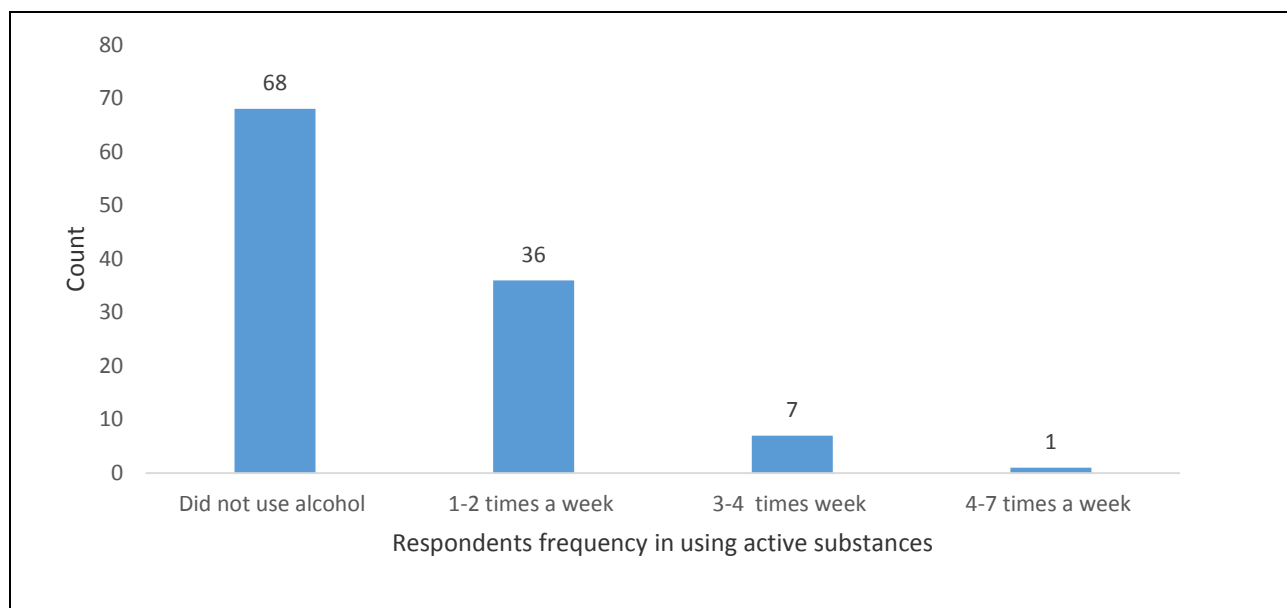


Figure 4.12 Distribution of respondents by frequency in use of active substances in the past 1 month

Of the 51 respondents who were using active substances, 60.7% (n=68) reported not using active substances in the past 1 month, 32.1% took 1-2 times a week, 7(6.3%) took 3-4 times a week and only 1 (0.9%) respondent took 4-7 times a week. These findings concur with findings that use of alcohol in the past one month was significantly associated with the risk of non-adherence (Achappa et al 2013:222; Do, Dunne, Kato, Pham & Nguyen 2013:5).

4.3.2.2.5 Respondents disclosure of HIV status to the community (N=112)

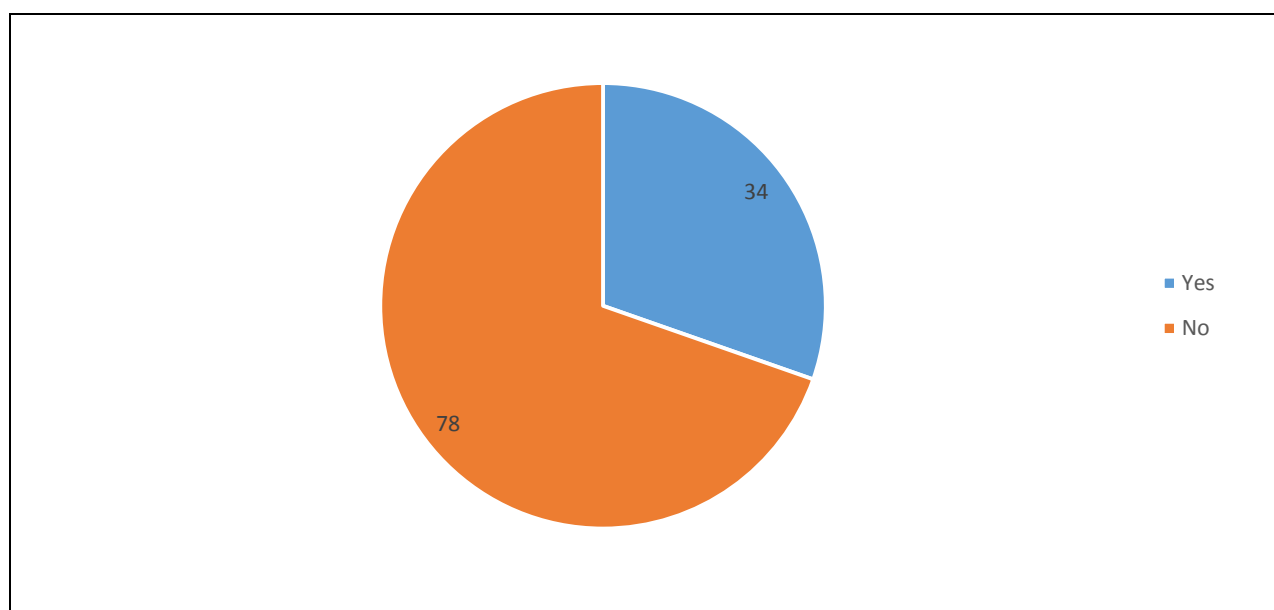


Figure 4.13 Distribution of respondents by disclosure of HIV status to community

Figure 4.11 above shows the findings pertaining to respondents disclosing their HIV status to the community. Only 30.4% (n=34) had disclosed their HIV status to the community while the majority 69.6% (n=78) had not disclosed. This is contrary to findings from Ethiopia where 70.9% disclosed their HIV status to community (Tsega et al 2015:376). The low community disclosure could also be a contributing factor to respondents feeling uncomfortable to take ARVs in the presence of others. These findings support previous findings which have revealed that lack of community disclosure was highly associated with non-adherence (Franke et al 2011:1483; Wasti et al 2012:75).

4.3.2.2.6 Emotional status of respondents in the past 1 month (N=112)

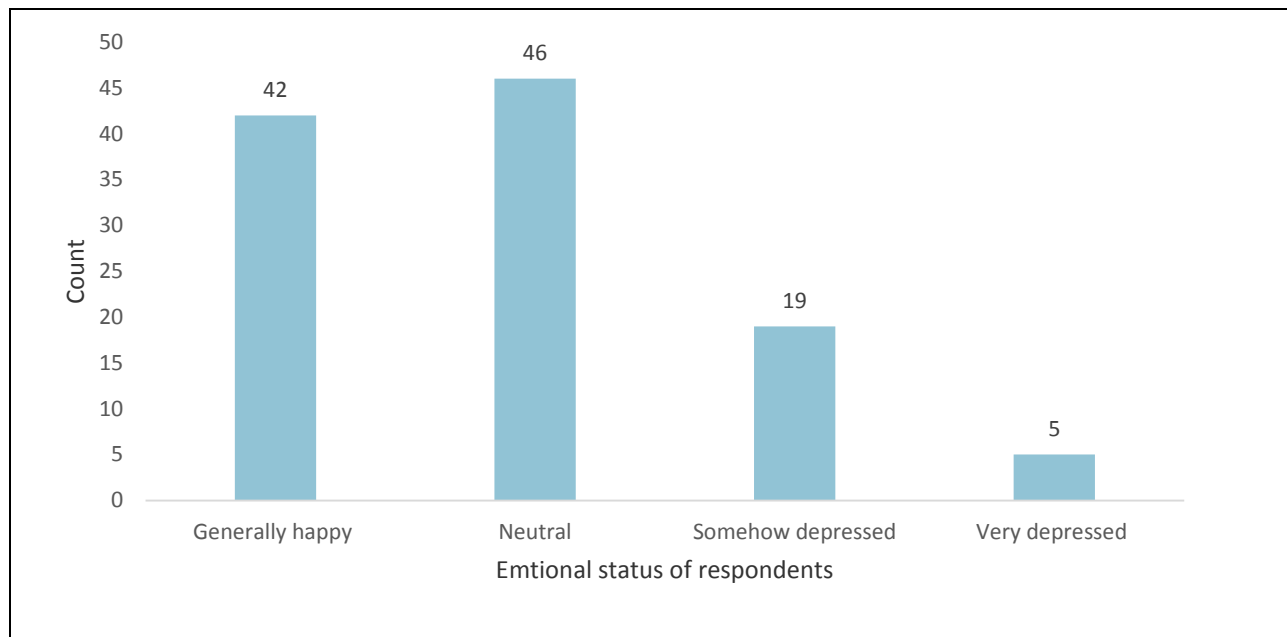


Figure 4.14 Emotional statuses of respondents in the past 1 month

Concerning the emotional status of the respondents in the past 1 month, 37.5% (n=42) reported being generally happy, 41% (n=46) were neutral, 17% (n=19) were somehow depressed and 4.5% (n=5) were very depressed. In total 21.5% of respondents were depressed in the past one month. It is of note that when asked for reason for missed dose a total of 6 (4.2%) respondents cited stress as their reason for missed doses. The association between emotional status particularly depression and non-adherence were documented by Negash (2013:66) in Ethiopia.

4.3.2.2.7 Respondents responses on whether taking ARVs remind them of the HIV infection (N=112)

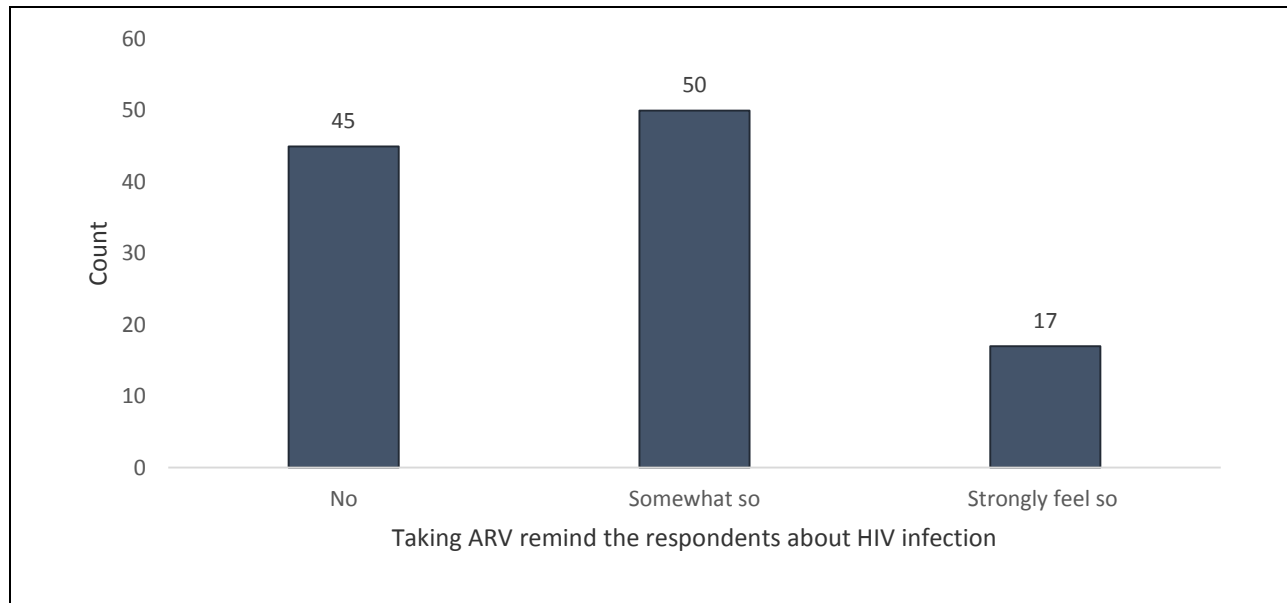


Figure 4.15 Respondents responses on taking ARVs remind them of the HIV infection

Figure 4.13 shows that 40.2% (n=45) respondents were of the opinion that taking ARVs did not remind them of the HIV infection, a 59.8% (n=50) thought it somehow reminded them and 15.2% (n=17) thought it strongly reminded them of the HIV infection. As such, taking ARVs reminded some of the respondents about the HIV infection which could be a contributing factor to them missing the doses in a bid to forget about the infection.

4.3.2.3 System related factors

In this section respondents were asked about how convenient they found the ART clinic, their satisfaction with the healthcare workers and if they had ever found the pharmacy out of stock of their ARVs.

4.3.2.3.1 Convenience of the ART clinic to respondents (N=112)

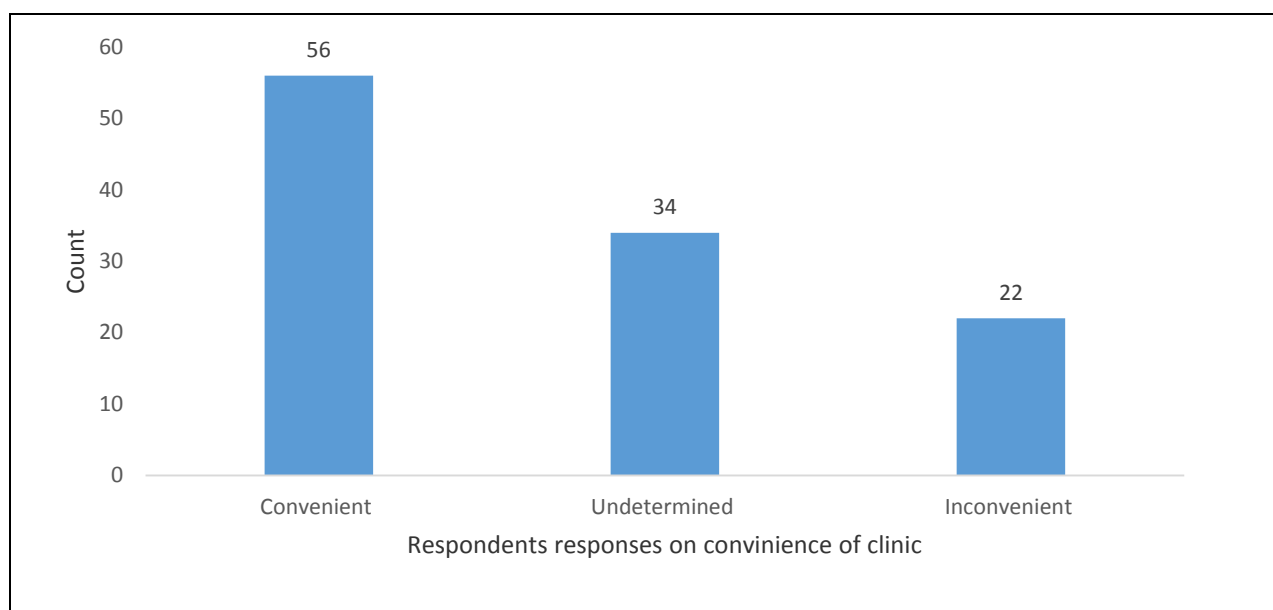


Figure 4.16 Distribution of respondents on convenience of clinic

As shown in figure 4.14, 50% (n=56) found the clinic convenient, 34% were undetermined and the remaining 22% found the clinic inconvenient. Some respondents positively commented on the nurses and community counsellors' behavior. However, other respondents' were mainly dissatisfaction with the distance of clinic from their homes. Other respondents 8(7%) were of the opinion that MoHSS should build more ARV clinics within the district. Ten (7%) respondents cited transport challenges as reason for missing doses. This included 7 (4.9%) respondents who reported that they did not have tax money to come to the clinic and 3 others who failed to get transport from farms where they work to the clinic for follow-up care. Similar findings have been reported in Uganda, where transportation costs accounted for 7.8% of reasons why patients were non-adherent (Senkomago et al 2011:1246). The association between transport challenges and non-adherence were also reported by Biadgilign et al 2009:148; Tabatabai et al 2014: [6]).

In this study some respondents felt the healthcare workers could be more efficient in their work. This inconvenience experienced by respondents in accessing their HIV care at the clinic may have been associated with non-adherence at the study site.

4.3.2.3.2 Respondents satisfaction with the healthcare workers (N=112)

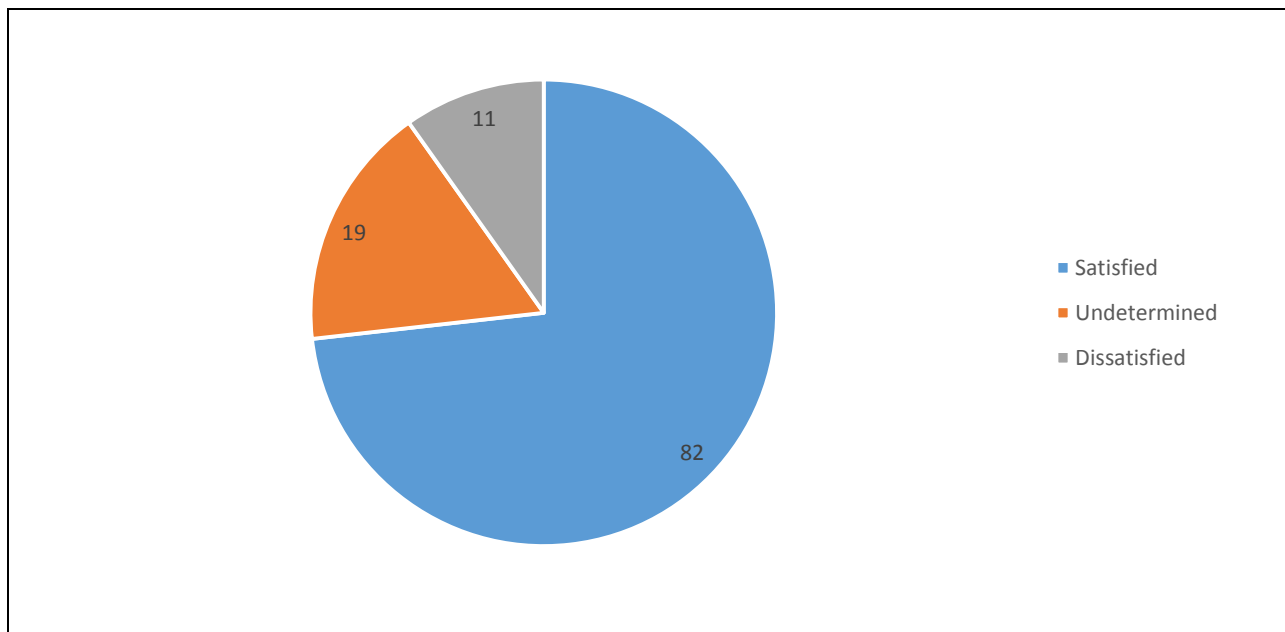


Figure 4.17 Respondents satisfaction with the healthcare workers

Findings revealed that 73.2% (n=82) of the respondents were satisfied, 17% (n=19) were undetermined and the remaining 9.8% were dissatisfied with the healthcare workers. Fourteen (12.5%) respondents were satisfied with the care they received from the nurses. However, the patient satisfaction with healthcare workers in this study was much lower than that reported in Northern Namibia where 95% of the respondents were satisfied with the services of healthcare workers (Nghoshi 2016:47). Although the satisfaction in this study was higher than in other studies, attention should still be given to the 27% who were not satisfied with the services of healthcare workers (Tsega et al 2015:376). These findings agree those reported by Boyer et al (2011:1383) who highlighted that poor communication with healthcare workers was one of the reasons for non-adherence and treatment interruption by patients. The research findings point out that patient–healthcare worker relationship is an associated factor to non-adherence. Other studies also revealed a significant relationship between perception of study respondents on patient-healthcare worker relationship and their adherence to antiretroviral treatment (Abdissa 2013:120; De & Dalui 2012:251)

4.3.2.3.3 Responses on if respondents have ever found the pharmacy out stork of your ARVs (N=112)

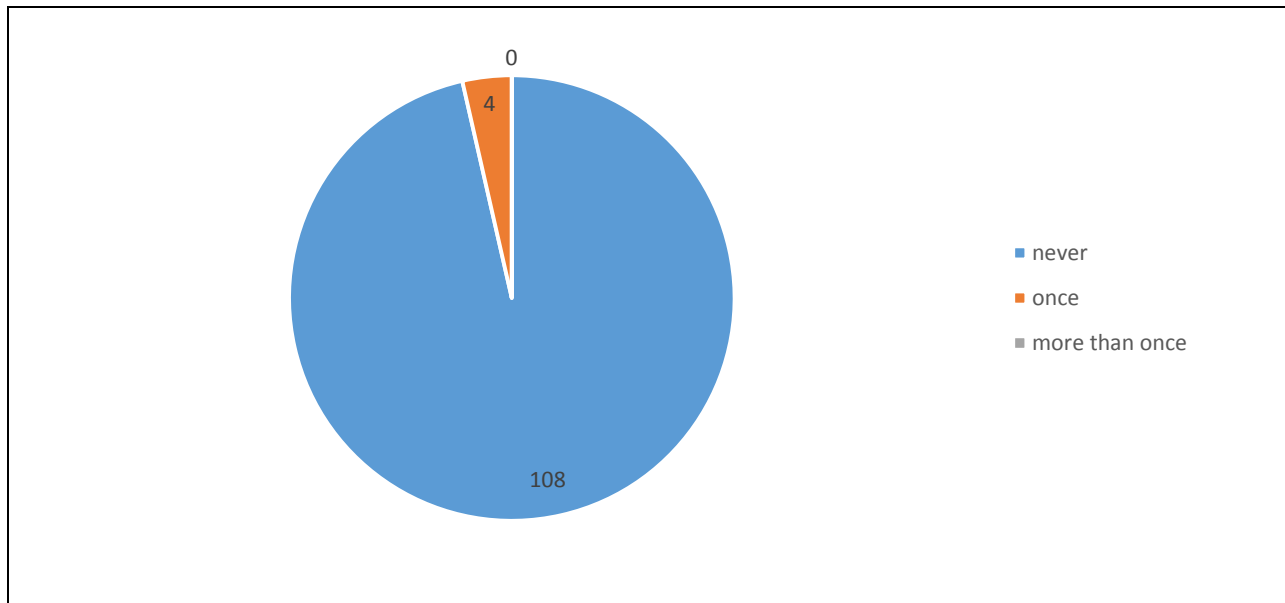


Figure 4.18 Respondents have ever found the pharmacy out stork of your ARVs

A resounding 96.4% had never found the pharmacy out of stock of ARVs due timely supply of ARVs at health facilities across the country. Only 4 (3.6%) respondents had ever found the pharmacy out of stock of their ARVs, It can be concluded in this study that non-adherence is not related to medicine supply at the pharmacy at this study site. Similar findings are reported by Abdissa (2013:128) where the majority (94.2%) of the respondents had not encountered problems in refilling their ARV drugs at the pharmacy. On the contrary, in Nigeria Uzochukwu et al (2009:192) reported that non-availability of drugs at treatment sites was one the reasons for non-adherence.

4.3.2.4 Disease and treatment related factors

The focus of questions in this section was to gather data on attributes pertaining to the ARV medicines themselves and the HIV disease which could be associated to the non-adherence in the study respondents.

4.3.2.4.1 Respondents duration on ARV treatment (N=112)

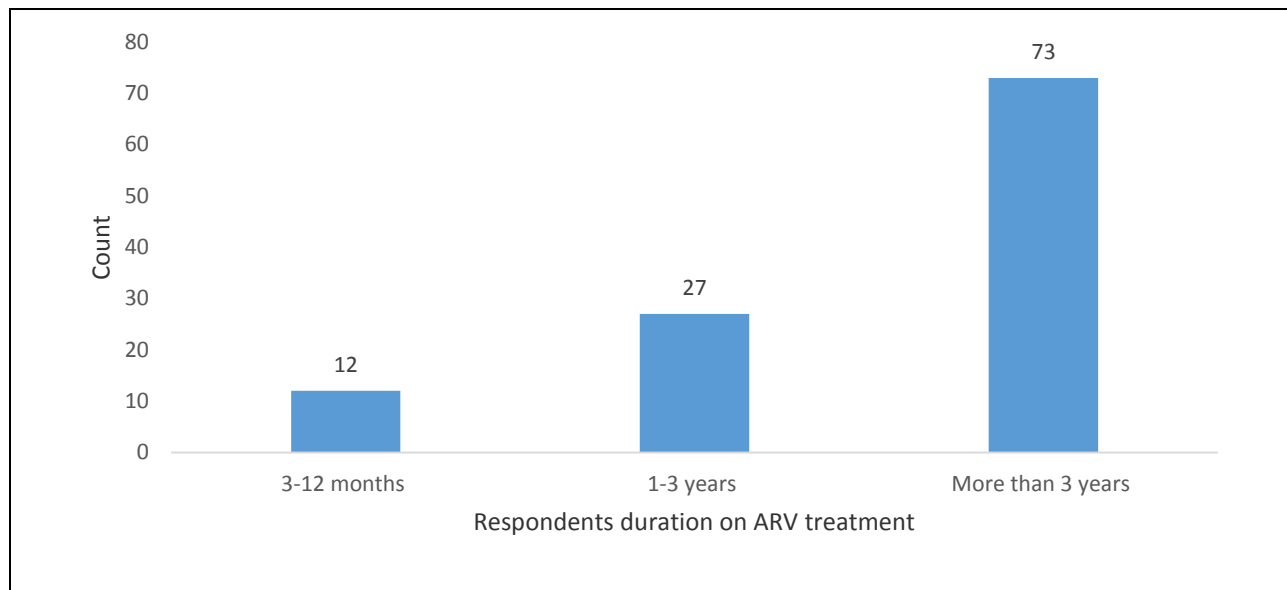


Figure 4.19 Respondents duration on ARV treatment

In this study 10.7% (n=12) were on ARV treatment for 3-12 months, 24.1% (n=27) were on treatment for 1-3 years and the majority 65.2% (n=73) were on ARVs for more than 3 years. Most of the non-adherent patients were found in the duration of more than 3 years on ARV treatment. It is noteworthy that on being asked for reason for missed dose 3 (2.1%) respondents highlighted that they got tired of taking the ARV medicines. These findings are similar to those of Venkatesh, Pathmanathan and Brownlee (2010:799) who found that respondents on ARV treatment for more than 2 years were more likely to be non-adherent than respondents who had been on treatment for less than 2 years. Gari et al (2013:7) also reported that taking ART for more than two years was positively associated with adherence in high income countries. However, other studies have not yielded any statistically significant association between duration on treatment and adherence to ART (Drachler, Drachler, Teixeira & De Carvalho Leite 2016:[2]; Abdissa 2013:130).

4.3.2.4.2 Respondents responses on whether they have you ever experienced any side effects to ARVs (N=112)

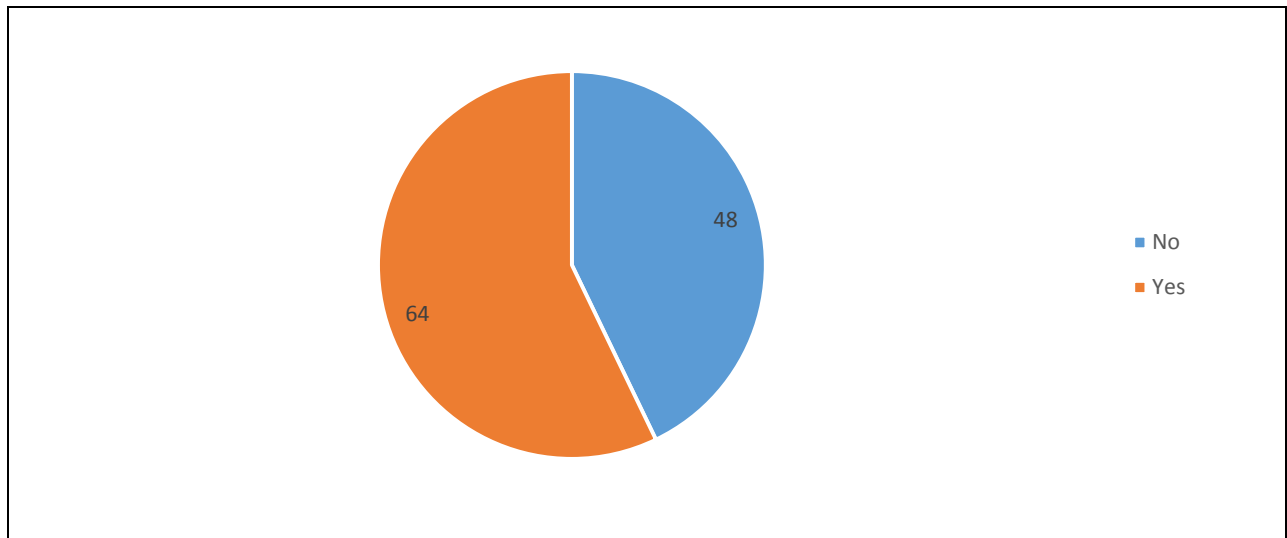


Figure 4.20 Distribution of respondents who have experienced ARV side effects

Study results as depicted in figure 4.17 show that 42.9% (n=48) had not experienced side effects of ARVS while the majority 57.1% (n=64) had at one time suffered from ARV side effects. Respondents who experienced ARV side effects were more than double those reported by Nghoshi (2016:42) who found only 20% of respondents in a study in Northern Namibia reported experiencing side effects of ARVs. This was also higher than that reported from Ethiopia where 53% of respondents had experienced side effects (Tsega et al 2015:375). About 3 (2.1%) respondents commented that ARV side effects were the reason for missing doses. As observed in this study, experiencing side effects was associated with non-adherence at the study site. In their study, Uzochukwu et al (2009:192) also documented physical side effects of ARVs among reasons for non-adherence.

4.3.2.4.3 Distribution of respondents who have special instructions regarding ARVs and food (N=112)

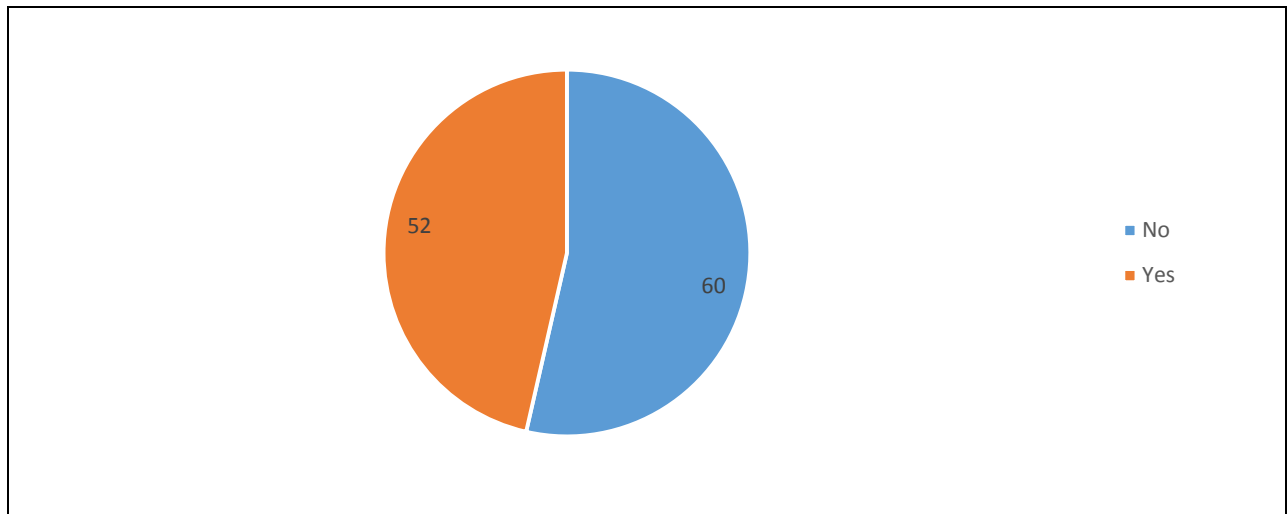


Figure 4.21 Distribution of respondents who have special instructions regarding ARVs and food

Pertaining to instructions regarding ARVs and food, 53.6% (n=60) responded “yes” to having special instructions relating to ARVs and food while 46.4% (n=52) who did not have any special instructions. The currently recommended ARV regimen in Namibia of TDF/3TC/EFV which the majority of respondents were on has no documented food restrictions as outlined in the ART guideline. Seven (4.9%) respondents commented that not having food to take with the ARVs as the reason for missed dose. These findings are similar to those reported by Nghoshi (2016:42) where 7% of study respondents complained of dietary requirements.

4.3.2.4.4 Respondents general health status been in past 1 months (N=112)

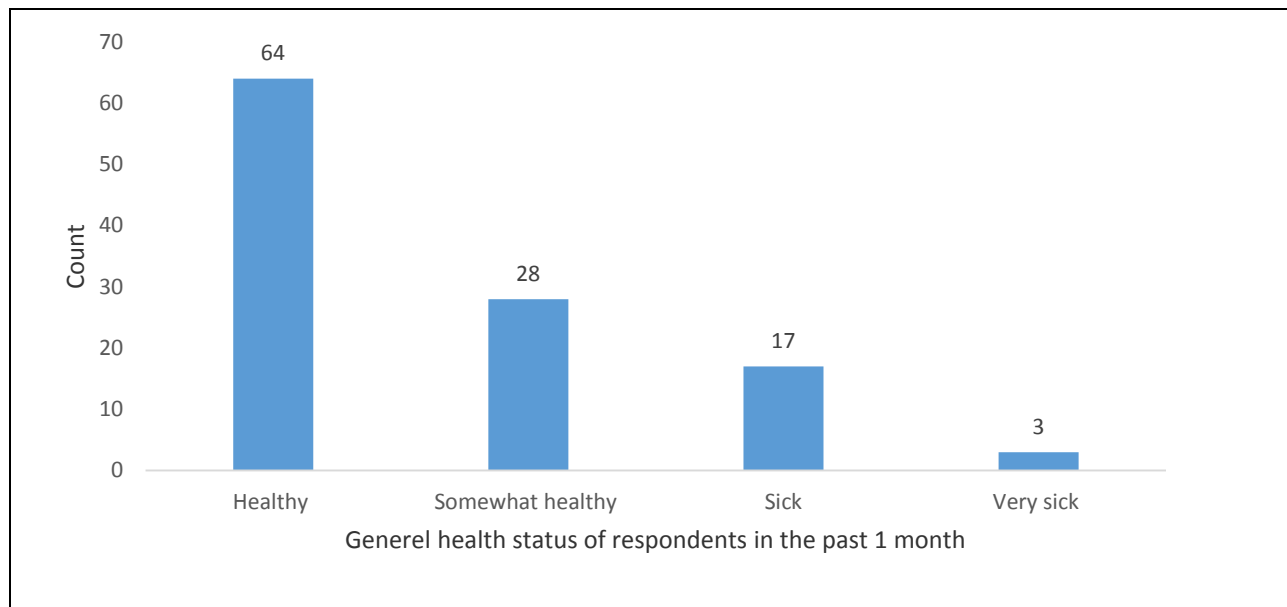


Figure 4.22 Distribution of respondents by their health status in the past 1 month

Findings of the study showed that 57.1% (n=64) of the respondents although non-adherent were healthy in the past 1 month, 25% (n=28) were somewhat healthy while 17% were sick and 2.7% (n=3) were very sick. The results show that about one fifth of the sample had been sick in the past one month whilst the 80% were healthy. In South Africa and Ethiopia, studies have proven a statistically significant association between adherence to ART and illness in the past one month (Kranzer et al 2010:17; Abdissa 2013:88). Charurat et al (2010:[5]) also highlighted that patients who had other health conditions were positively associated with good adherence while those with CD4 of more than 200 cells/ml were found to be more non-adherent. Sickness was observed to be also a barrier to adherence. It was also noted in this study that 4 (3.5%) respondents responded that the reason for missed dose was due to feeling too sick to come to the clinic.

4.3.2.5 Cultural and religious beliefs related factors

Data presented in this subsection is on respondents' cultural and religious beliefs towards HIV and ART treatment.

4.3.2.5.1 Responses of respondents on whether taking ARV medicines offend any of your cultural beliefs (N=112)

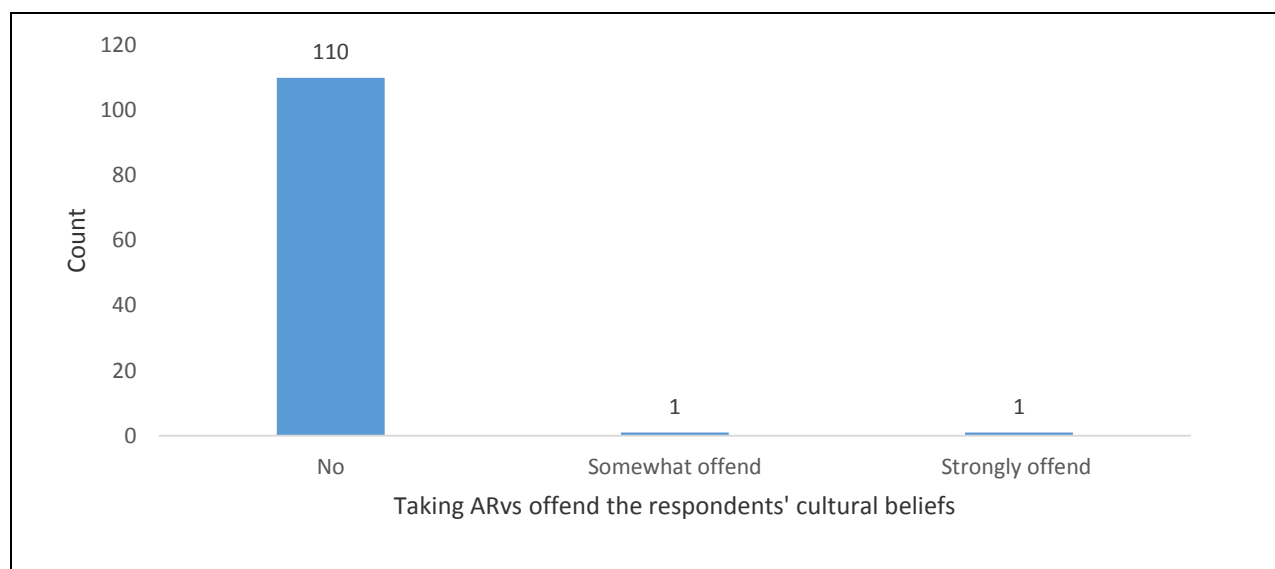


Figure 4.23 Distribution of respondents' responses on whether taking ARV medicines offend their cultural beliefs

As shown in figure 4.17 above, 98% (n=110) of the respondents were of the opinion that taking ARV medicines did not offend any of their cultural beliefs. Only 1(0.9%) respondent responded that taking the ARV medicines offended their cultural beliefs. The results revealed that the non-adherence reported at the study site was not related to patients' feelings on whether ARV treatment offended their cultural beliefs.

4.3.2.5.2 Respondents responses on whether HIV infection can be treated by cultural methods without ARV medicines (N=112)

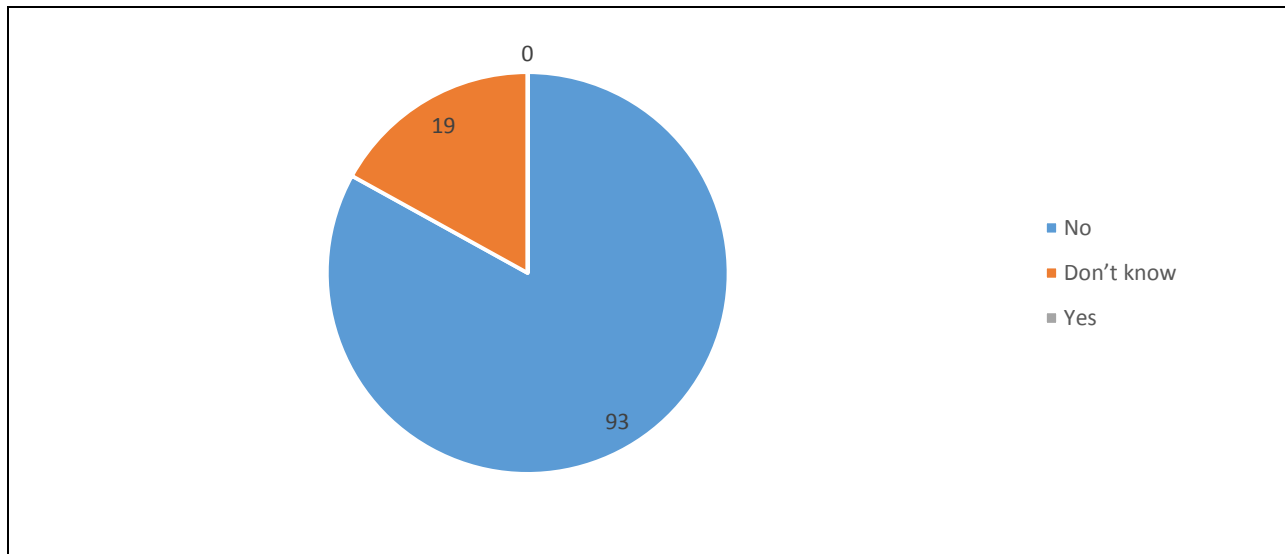


Figure 4.24 Respondents responses on whether HIV infection can be treated by cultural methods without ARV medicines

Figure 4.20 shows that 93% (n=83) were of the opinion that HIV cannot be treated by cultural methods, 17% (n=16) did not know and none of the respondents felt the infection can be treated by cultural methods. The results showed that the respondents did not believe cultural methods were an alternative therapy to ARV treatment. In another study in Northern Namibian, 11% of respondents reported taking other traditional treatments together with ART (Nghoshi 2016:42).

4.3.2.5.3 Distribution of respondents on whether taking ARV medicines offend any of their religious beliefs (N=112)

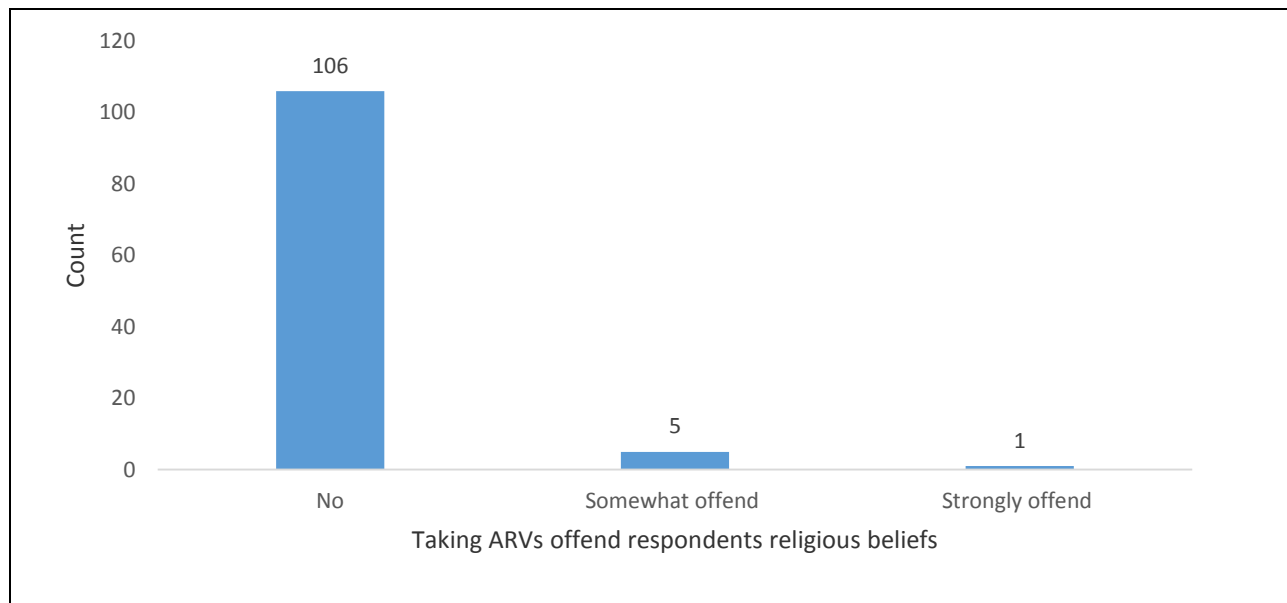


Figure 4.25 Distribution of respondents on whether taking ARV medicines offend any of their religious beliefs

In this study 94.6% (n=106) respondents were of the opinion that their religion was not offended by taking ARVs, 4.5% (n=5) did not know and 0.9% (n=1) was offended. The results of this study did not reveal ARVs offending respondents' religious beliefs as an associated factor to non-adherence.

4.3.2.5.4 Respondents responses to whether they think HIV infection can be treated by religious methods without ARV medicines (N=112)

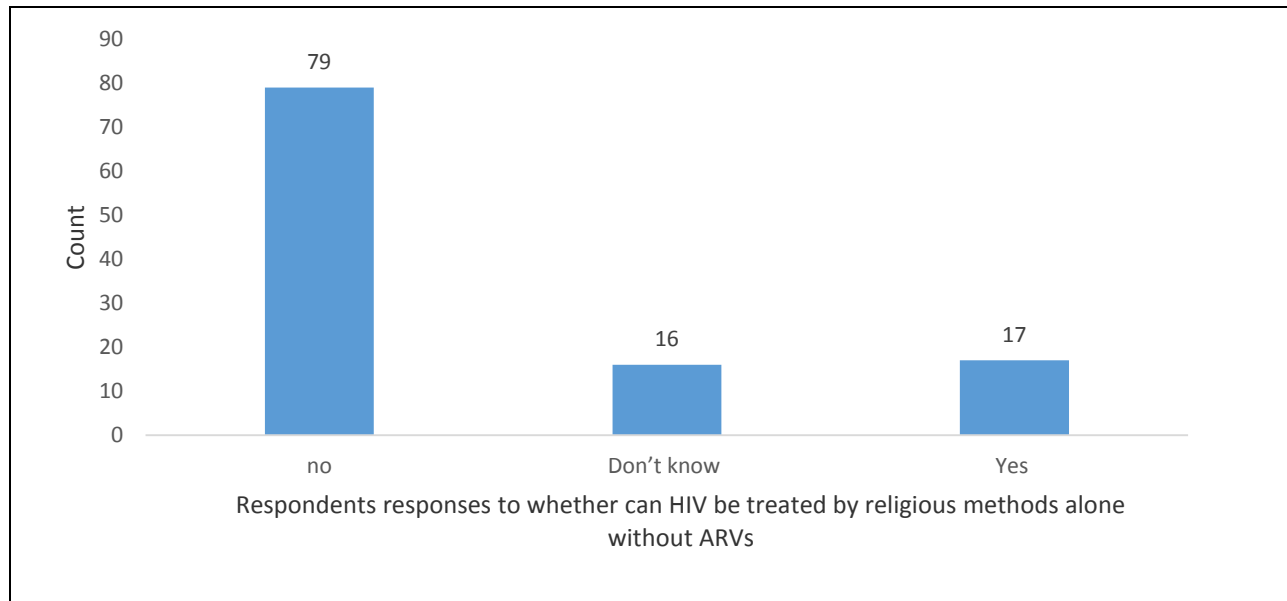


Figure 4.26 Respondents responses on whether they think HIV infection can be treated by religious methods without ARV medicines

All the 112 respondents practiced the Christian religion (26.8% Catholics, 56.3% Orthodox and 17% protestant). Findings of this study revealed that 70.5% (n=79) commented that HIV cannot be treated by religious methods, 14.3% (n=16) did not know and a notable 15.2% (n=17) believed that HIV can be treated by religious methods without ARVs. Similar findings were reported in rural South Africa by Loeliger et al (2016:982) highlighted that among reasons for non-adherence was tension between ART and alternative therapies which included religion.

4.3.2.6 Independent variable

4.3.2.6.1 Study respondents adherence score (N=112)

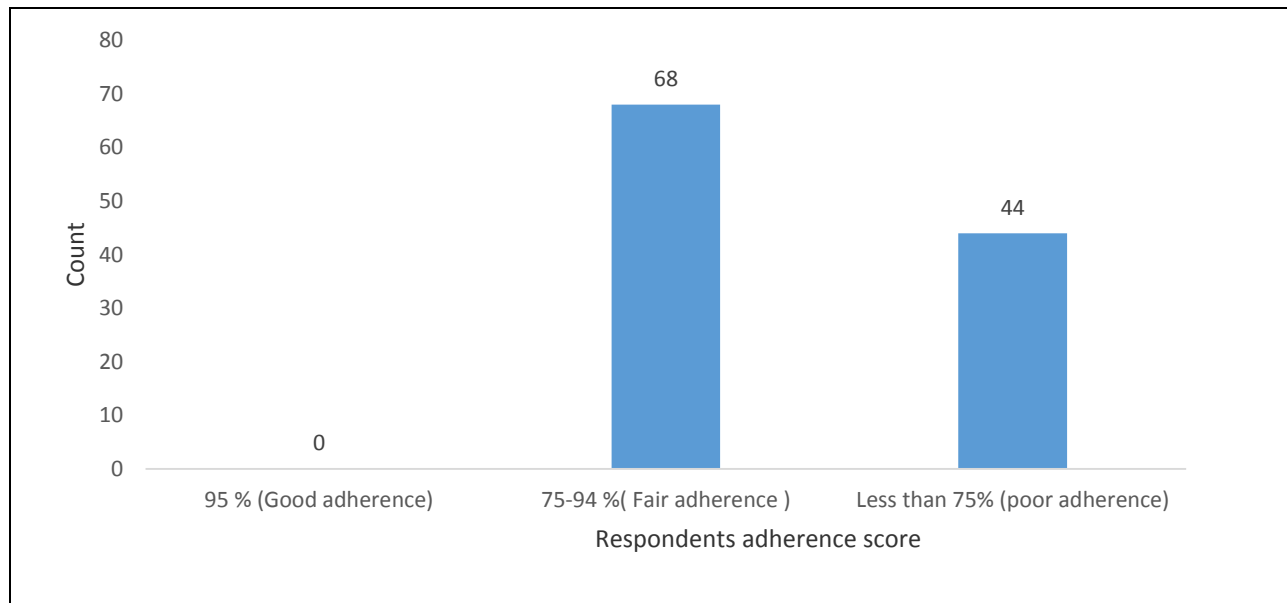


Figure 4.27 Respondents adherence score

Only non-adherent patients were eligible to be part of this study. The adherence scores in this study according to pill count was 61% (n=68) of the respondents had fair adherence of 75-95% while 39% (n=44) respondents had adherence score less than 75% which is regarded as poor adherence. The sample size had a rate of non-adherence of 36.7%.

4.3.2.6.2 Respondents' viral load (N=112)

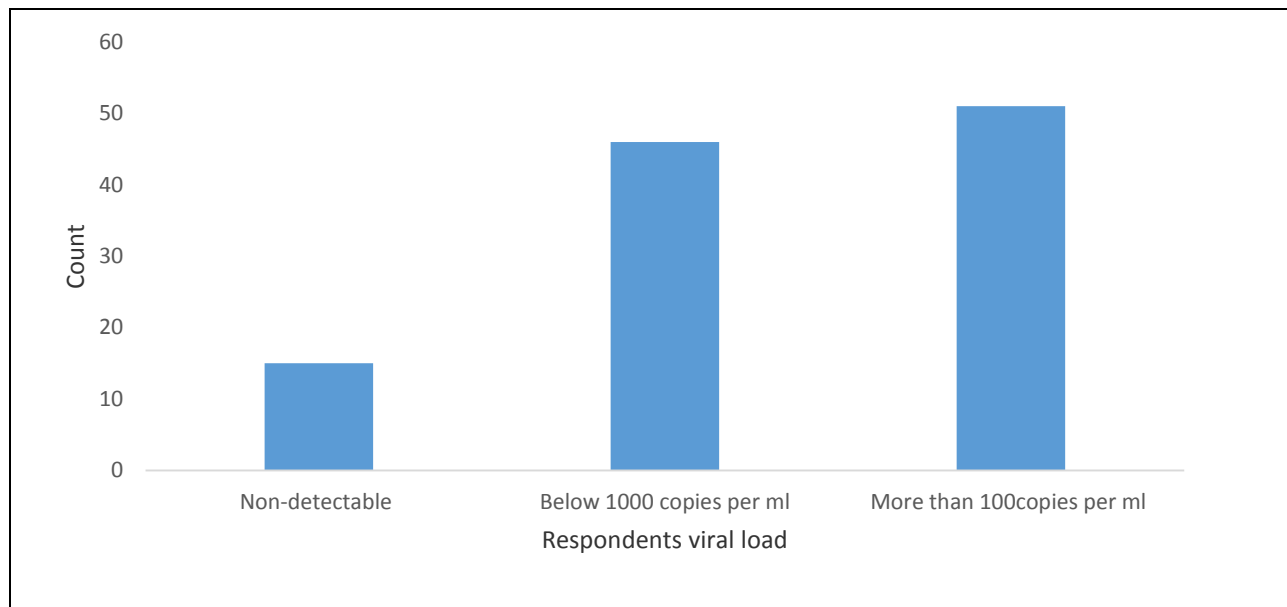


Figure 4.28 Respondents viral load

Although all respondents in this study were assessed as non-adherent it is noteworthy that a significant 13.4% (n=15) had non-detectable viral load. A possible explanation was that blood for viral load testing was drawn one to two months prior to participating in the study when the patients were still adherent, while adherence in this study focused on only the previous one month. Another possibility for the non-detectable viral load could be that the adherence assessment by pill count method was different to that shown by the biological markers which revealed maximum viral suppression. 41.6% (n=46) respondents had viral load below 1000 copies per ml while a worrisome 45.6% (n=51) respondents had more than 1000 copies per ml of blood which is regarded as treatment failure. The study showed a total of 86.6% of the respondents had unsuppressed viral load as all respondents in this research were non-adherent. On the contrary, in a study in Myanmar, 94% of patients had an undetectable viral load and only 4% had ART failure (Kaleebu, Kirungi, Watera, Asio, Lyagoba, Lutalo, Kapaata, Nanyonga, Parry, Magambo, and Nazziwa 2015: [1]). It was further reported that 84.7% of respondents on first and second line treatment in the Myanmar study had viral load below 1000 copies/ml (Kaleebu et al 2015: [1]).

4.3.2.6.3 Respondents WHO clinical stage (N=112)

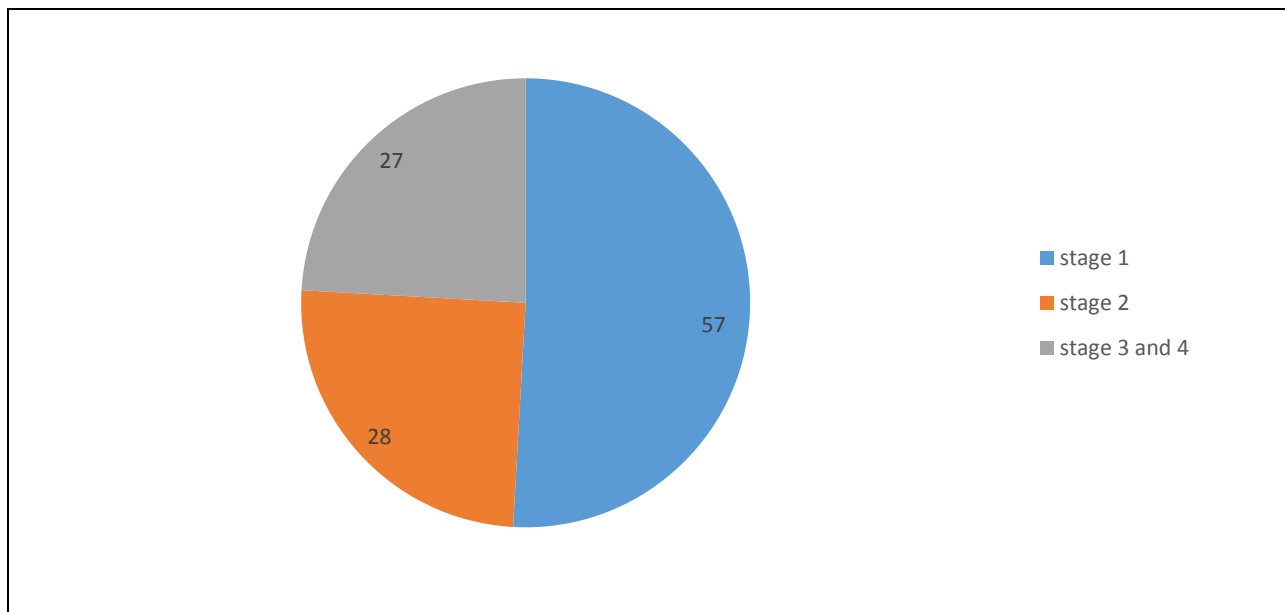


Figure 4.29 Respondents WHO clinical stage

Figure 4.29 illustrates that 51% (n=57) of the respondents were asymptomatic and in WHO clinical stage 1. 25% (n=28) respondents had a WHO stage 2 defining condition while the remaining 24% (n=27) were stage 3 and 4. In this study the number of asymptomatic respondents (51%) was almost equal to that of symptomatic respondents (49%). These results are similar to those reported in Zambia where WHO clinical stage was not predictive of non-adherence (Chi et al 2009:751). Other studies did yield a relationship between WHO clinical stage and adherence. Abdissa (2013:63) documented a statistically significant association between WHO clinical stage before initiation of antiretroviral therapy and combined adherence to ART. Conversely, Negash (2011:57) reported that the level of adherence to treatment was inversely proportional to the WHO clinical stage

4.3.2.7 Respondents responses to the open-ended questions

At the end of the interview respondents were asked if they had any additional comments they wished to say. Below is a brief description of the responses.

4.3.2.7.1 Respondents' responses on the reason/s for ARV missed dose (N=142, Total=100%)

All the 112 respondents in the study were asked for the reasons for missed dose. Some respondents mentioned more than one reason. The total number of reasons mentioned by the 112 respondents was 142. However, some reasons were recurring among respondents and were summarised together. For presentation purposes the reasons were classified into the categories of socio-demographic, patient-related, service system related, disease and treatment related and cultural and religious factors.

Table 4.2 Summary of the reasons shared by respondents for missing dose/s (N=142, Total=100%)

Section	Main theme	Number of times reason is mentioned (n)	Percentage (%)	Examples of respondents responses
Socio-demographic and economic characteristics	Due to travelling	6	4.2%	✓ <i>I went for travel and slept on the way</i> ✓ <i>I travelled to the North and ran out of ARVs</i>
	Work commitments	14	9.9%	✓ <i>Morning parade prolonged beyond 8 o clock which is my time for taking ARVs</i> ✓ <i>Left early for work when I was supposed to take the treatment at 0700hr</i>
	Transport problems	10	7.0%	✓ <i>I did not get a hike to come to the clinic</i> ✓ <i>I did not have tax money</i>
	Lack of food	7	4.9%	✓ <i>When I don't have food I don't take ARVs</i>
	Social relationships	2	1.4%	✓ <i>Family problems, my daughter was sick and spent more time on my child and forgot myself.</i> ✓ <i>My boyfriend is positive but not on the medicines and he is refusing to use condoms what is the need for me to take ARVs</i>
Patient related factors	Forgot	31	21.8%	✓ <i>Forgot to take treatment on time I was watching TV</i>
	Alcohol use	22	15.5%	✓ <i>When I drink during the weekend I don't take ARVs</i>
	Due to stress	6	4.2%	✓ <i>I forgot to take my medicines due to stress caused by my boyfriend</i>
	Tired of taking the medicines	3	2.1%	✓ <i>Sometimes I just get tired of these tablets I know it's not good</i>

Section	Main theme	Number of times reason is mentioned (n)	Percentage (%)	Examples of respondents responses
	Not at home during time of taking medicines	2	1.4%	<ul style="list-style-type: none"> ✓ I went to overnight at relatives ✓ I was not at home did not take my medicines
	Others	3	2.1%	<ul style="list-style-type: none"> ✓ I got confused about time ✓ I moved from one family house to another and it was difficult for me to take the medicines. ✓ Over slept
	System related	14	9.9%	<ul style="list-style-type: none"> ✓ Patient was in prison in South Africa ✓ I was out of town and forgot my passport so I was refused medicines ✓ I was on the farm, the clinic is too far from our farm
	Service at the clinic	7	4.9%	<ul style="list-style-type: none"> ✓ Clinic is closed in the time am free, open the clinic at 7 before I stat work and during lunch hour also ✓ The waiting time at the clinic is too long ✓ The que was too long and I went back home ✓ I just don't like the way we receive our medicines at the pharmacy there is no privacy at all
	Heath care provider – patient relationship	2	1.4%	<ul style="list-style-type: none"> ✓ Missed the treatment due to poor treatment from the nurse at the ARV clinic which cause me to walk away without taking the medicines for almost a whole month ✓ Community counsellors and nurses are sometimes rude it discourages to come to the clinic ✓

Section	Main theme	Number of times reason is mentioned (n)	Percentage (%)	Examples of respondents responses
Disease and treatment related	Disease	5	3.5%	✓ <i>I was too sick to come to the clinic</i>
	ARV treatment	6	4.2%	✓ <i>The size of the pill was too big and I stopped taking them</i> ✓ <i>The medicines were making me sick</i> ✓ <i>The medicines were giving me headache and itching and I sometimes did not take</i>
Cultural and religious	Religion	2	1.4%	✓ <i>The truth is I don't believe in ARVs , I believe God is the healer nurses must stop forcing us to take ARVs</i> ✓ <i>My faith healed me</i>
Total		142	100%	

The reasons frequently mentioned by patients for missed doses included; forgetting 21.8% (n=31), alcohol use 15.5% (n=22), challenges in access treatment 9.9% (n=14), work commitments 9.9%, transport problems to health facility 7% (n=10), lack of food 4.9% (n=7), stress 4.2% (n=6), need for travelling to receive HIV care 4.2% (n=6). Other reasons also cited were due to the ARV treatment itself giving patient discomfort which included side effects 4.2% (n=6), HIV infection related sicknesses 3.5% (n=5), tiredness after taking ARVs 2.1% (n=3), social relationships 1.4%(n=2), healthcare provider–patient relationships 1.4% and religious beliefs accounting for 1.4%. These reasons for missed dose were similar to those reported from northern Namibia by Nghoshi (2016:43) who observed that the majority of the respondents 57 (20%) simply forgot, 32 (11%) indicated they had travelled away from home, while 26 (9%) attributed missing their dose(s) to alcohol use. In another study in Ethiopia, respondents cited missing their doses due to forgetfulness 29 (43.3%), missing appointment 14 (20.9%), having run out of medicines 9 (13.4%), depression, anger, or despair 4 (6.0%), side effects 2 (3.0%), and 2 (3.0%) of respondents did not think that ARV medicines were important (Tsega et al 2015:376).

4.3.2.7.2 Additional comments by respondents

In this part of the questionnaire, respondents were asked for any other comment before the interview was concluded. The reasons were classified according to the sections of factors associated with non-adherence from which main themes were created. Of the 112 respondents, 64 (57.1%) responded had no comments to say, 48 (42.8%) respondents gave some comments and 82% of the comments expressed dissatisfaction with the service delivery system. Main themes derived were that patients are dissatisfied with long waiting times at the clinic and pharmacy, poor attitude of lay-counsellors and short duration of prescriptions. Respondents suggested solutions included keeping the clinic and pharmacy services running during lunch hour, increasing number of staff, bringing all ART services under one roof and decentralising ART services to other primary healthcare facilities. The comments are summarised in Table 4.3 below.

Table 4.3 Respondents responses on any additional comments (N=48, Total=100%)

Section		Frequency	Example of respondents responses
Socio-demographic and economic characteristics		1/48=2.1%	<i>Government to provide houses and blankets for unemployed people on treatment</i>
Patient-related factors		0/48=0%	<i>None</i>
System-related	Comments expressing satisfaction with the system	5/48=10.4%	<i>Nurses must continue with their good job</i> <i>Continue with the good job</i> <i>Staff are very helpful</i>
	Comments expressing dissatisfaction with the system	39/48=81.2%	<i>Staff are nice but too slow</i> <i>The ARV clinic healthcare worker must also dispense the medication at the ARV clinic and not the pharmacy to reduce the time</i> <i>Ministry must dispense ARVs at all the other clinics like other medicines</i> <i>Please give all the services at one point</i> <i>Community counsellor must improve her attitude</i> <i>I don't like the fact that we are isolated and privately treated at the pharmacy</i> <i>Counsellors are rude to us</i> <i>Clinic must not close for lunch hour pharmacy also</i> <i>Drs and nurses are too few</i> <i>When we want to be helped in the North the ques are too long and the people also refuse to help us</i> <i>Drs must come and see us at our clinic when we go to see Dr at OPD the que is too long</i> <i>When we (ARV patients) go to the pharmacy our passports are served last even after those who came after us</i> <i>Ques are very slow and long</i> <i>The time spend at pharmacy is too long</i>
Disease and treatment-related		1/48=2.1%	<i>They must make an injection to give us only once a month because we forget</i>
Cultural and religious		2/48=4.2%	<i>Nurses must stop forcing us to take ARVs especially when I believe God is the healer not people or medicines</i>

A few of the comments given by respondents in this study were similar to those reported in other studies. Nghoshi (2016:48) noted that the slow pace of service providers or long waiting period were among the reasons why respondents were not satisfied with the quality of health services. The majority of the respondents' comments are particular to the study setting which made these research findings more relevant and informative for this study site.

4.4 OVERVIEW OF RESEARCH FINDINGS

The rate of non-adherence at the study site was 36.7%. The sample had 112 respondents who were all assessed as non-adherent according to pill count. There were more women (56.3%) than men (43.8%) in the sample. The results showed that the age group of 31-45 years was the most non-adherent (54.5%), the majority of the respondents (71.4%) were unmarried, more than 70% attained basic education or less and 45.5% of respondents used active substances. While 78% had not disclosed their HIV status to the community, approximately (60%) felt taking ARV treatment reminded them of the HIV treatment. Most of the respondents (57.1%) had experienced side effects of ARVs, 46.2% had special instructions regarding their ARV treatment and food and a recognisable 15.2% believed HIV infection could be treated by religious methods alone without ARV treatment. 28% of the respondents were dissatisfied with the healthcare providers.

Among the main reasons for missed dose was forgetfulness 21.8%, alcohol use 15.5%, challenges in accessing treatment 9.9%, work commitments 9.9%, transport problems to health facility 7%, lack of food 4.9%, stress 4.2%, due to travelling 4.2% and 4.2% of the respondents missed doses due to side effects. Social relationships, healthcare provider-patient relationships and religious beliefs contributed 1.4% each for the reasons for missed doses. In general, the majority 67% (n=47) of reasons mentioned were under patient related factors, followed by socio-demographic factors 27.5% (n=27), 16.2% were system related, 7.7% were disease and treatment reasons and lastly 1.4% were religious reasons. 86.6% of respondents had unsuppressed viral load while 24% of the respondents had a clinical condition which placed them in WHO stage 3 or 4.

4.5 CONCLUSION

This chapter presented the study results. Data was presented in graphs, pie charts and tables. The findings were presented according to the questionnaire which was used in data collection under the subsections of sample characteristics, patient related factors, system related factors, cultural and related factors. The chapter concluded by narrating the main themes which came out from respondents on reason for missed doses and other additional comments. The next and final chapter presented summarised study findings, recommendations and conclusions of the study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This final chapter of the study gave the summary of the outcomes of this research together with their interpretation. The chapter outlined the findings pertaining to the level of adherence and factors associated with non-adherence to Anti-retroviral treatment in adults at the study site. Conclusions, recommendations, contributions of the study and its limitations were also outlined in this chapter. Finally, the chapter presented the concluding remarks for the study.

5.2 RESEARCH DESIGN AND METHOD

This study was a quantitative research design and descriptive non-experimental in nature. The study population was HIV positive adults receiving HIV care at a hospital in Namibia. Target population was HIV positive adults 21 years and older on ARV treatment for minimum duration of 3 months. A cross-sectional study was carried out on a sample of 112 adults. Data was collected from the 3rd of August until 7th September through face to face structured interviews. Respondents were selected using census and multi-stage sampling. Adult patients who attended the study site during the data collection period were all assessed for their adherence using the pill count method. All adult patients who had an adherence score of less than 95%, were 21 years and older and were on ARV treatment for 3 months or more were eligible to participate in the study. The principal investigator and data collectors approached such patients for participation and only those who gave verbal consent and written consent were included in the study. Ninety-four respondents were identified using this method of identifying non-adherent patients using the follow-up visit adherence score from pill count assessment. Eighteen more respondents were identified using electronic (EPMS) and confirmed using paper records (Patient care booklet). These were approached telephonically and also gave written consent to participate in the study. Although the study required only a minimum of 100 respondents, the final number of respondents was 112. Most respondents preferred to be

interviewed at the clinic, in a private area in the pill counting room, instead of at their homes or at any other place.

5.3 SUMMARY AND INTERPRETATION OF THE RESEARCH FINDINGS

The interpretation of the research findings were presented in relation to the Health Belief Model theory and the conceptual framework of the study on factors associated with non-adherence. As discussed in chapter 1 the HBM theory used in this study assumed that the patient's ability to adhere to ART was strongly dependent on a number of concepts. The concepts were how the patient views his risk of being non-adherent to ARVs, how serious is the problem of non-adherence, beliefs on the importance of adhering to ARVs, the cost of being adherent to the medicines, strategies to enhance adherence and lastly the individual patient ability to actually take the ARV medicines as prescribed. The data collection tool inquired on these concepts whose findings are interpreted in summary.

5.3.1 Non-adherence at the study site

This study concluded that there was an abnormally high non-adherence (36.7%) at the study site warranting corrective interventions. The non-adherence was correlating with a very high number of patients (86.6%) with unsuppressed viral loads. The study results concur with those in another study that showed viral loads are strongly dependent on patient adherence (El-Khatib et al 2011:[3]). However, it is noteworthy that 66.3% of the adult patients at the study site were found to be adherent to their medicines according to pill count method. According to the Health Belief Model such non-adherence resulted from low perception of patient susceptibility where patients feel they are not prone to missing ARV doses or interrupting treatment. Additionally, patients could view non-adherence as being better than completely stopping who and therefore perceive the problem of non-adherence lightly. Patients who perceive the benefits of ART lowly, experience barriers to adherence, have low patient self-efficacy and have minimal strategies to enhance adherence are most likely to be non-adherent. These factors which were investigated in this study are discussed below.

5.3.2 Factors associated with non-adherence

The concepts of the HBM were synced into the WHO (2003: [27]) categorisation of factors that influence patient adherence. These modifying factors which have a bearing on the constructs of the Health Belief Model were discussed under socioeconomic, treatment related factors, patient-related factors, disease related factors and healthcare delivery system related factors. This study added an additional class of cultural and religious related factors

5.3.2.1 Socio-demographic and economic characteristics

The study findings showed that females, adults in age group of 31-45 and unmarried were found to be more non-adherent to ARV medicines. Most of these non-adherent respondents were also of low educational status. These aspects were highlighted as barriers to adherence in this study. These findings are all similar to those reported in previous studies by Tsega et al (2015:373) and Nuwagaba-Biribonwoha et al (2014: [10]). In contrast, on the sex attribute, Nghoshi (2016:29) reported men were more non-adherent than women. In another study, Abdissa (2013:65) reported no association between age and non-adherence. Non-adherence among females could be related to females in most African settings being burdened with household chores which may result in them forgetting their ARVs (Ipinge 2009:15).

Most adults in the age group of 31-45 years are actively employed which could have increased their chances of missing doses through work commitments, being away from home or being unable to collect their medicines from the clinic. As reported by Sasaki et al (2012:8), unmarried people were more non-adherent than the married. Similar finding were observed in this study which may be due to unmarried respondents not having treatment support as in the case of married couples supporting each other. Although it is often expected for families to support their members on ARV treatment, this study showed that the 70.5% of the non-adherent respondents were actually living with their families. Lack of family disclosure by respondents was shown to contribute to non-adherence as respondents could not receive family support to adhere to their ARV treatment. Alternatively, family members may not have been knowledgeable on how to support their relatives on ARV treatment.

5.3.2.2 Patient-related factors

The results revealed that although respondents were non-adherent, 97% valued ART as essential for their HIV care. This shows that the study site had successful ways of educating the patients on the importance of ARVs and HIV care. As such, the non-adherence experienced at this study site may not be attributed to the lack of understanding of the value of ARV treatment as only 1(0.9%) respondent disagreed that ART was essential. Despite successful patient education, a notable 45.5% of respondents were into active substances use and 43% of substance users highlighted they had missed an ARV dose at least once due to active substance use. This is almost double that reported in Tsega et al (2015:375) where only 22.5% in the study respondents used active substances. Beer et al (2012:220) also found active substance influenced patient adherence.

The study findings also showed that 39.3% of respondents were uncomfortable with taking ARVs in the presence of others while 70% had not disclosed their HIV status to the community. The study pointed out that most of the non-adherent respondents had never disclosed their HIV status to the community. This level of non-disclosure was higher than that reported in Tsega et al (2015:376) where 29.5% of respondents had not disclosed. In the 2013 DHS (MoHSS 2013a:178), only 28% of women and 26% of men aged 15-49 years had a complete acceptance attitude of those living with HIV/AIDS. This was of concern because stigma among those living with HIV also prevented their adherence to ART. It was observed that lack of disclosure to community was an associated factor to non-adherence in this study. Wasti et al (2012:75) also noted lack of community disclosure as being associated with non-adherence.

Findings of depression being associated with non-adherence were reported in Negash (2013:66). This study also highlighted that 22% of the non-adherent adults were depressed and 6 (4.2%) respondents highlighted stress as reason for missing ARV doses. While this study cannot conclude depression as an associated factor to non-adherence, it should however be noted that stress and its management thereof is vital to patients on HIV care.

Interestingly, among other patient related factors was that 60% of respondents responded that taking the ARV medicines reminded them of the HIV infection. This may act as a trigger towards depression among HIV patients. Negative outcomes of being reminded of HIV infection could be feelings of anger, self-blame, anxiety about their long-term health, the burden of taking ARV medicines their whole life and the possible restrictions the infection may bring in their lives. The study results suggest that some patients may avoid taking the ARVs in order to avoid being reminded of the HIV infection.

5.3.2.3 *System related factors*

Insightful findings were revealed in this study with regards to the service delivery system. Only half (50%) of the respondents found the clinic convenient for their care while the remainder were either undetermined (30.4%) or found it inconvenient altogether (19.6%). Respondents mentioned several reasons which are related to the service system for missing doses. These barriers to adherence as highlighted in this study included transportation costs to the clinic, unfriendly service hours, and high healthcare worker–patient ratios and the resultant long waiting hours. Senkomago et al (2011:1246) and Tabatabai et al (2014: [6]) both concluded that poor service delivery attributes were associated with non-adherence. As reported in the Presidential Commission of Enquiry (MoHSS 2013a:9), the public health sector suffers from inadequate numbers of staff, availability of equipment, materials, medicines and appropriate technologies. These items are often inadequate due to limited funding, poor management processes and together have been attributed to poor service delivery which in turn has been associated with non-adherence.

Healthcare workers are pivotal to patients' perceptions of service delivery. Respondents' satisfaction with healthcare workers was 73.2% which was much lower than from similar studies conducted in Namibia where 95% of respondents were satisfied with their healthcare workers (Nghoshi 2016:47). Of the 9.8% of respondents who not satisfied with healthcare workers, some noted the rudeness of lay- counsellors as a reason for their dissatisfaction. While professional healthcare workers such as nurses are taught ethics of professional practice, lay counsellors are only receive limited training on ethics and counselling. This lack of professional training could have contributed to the perceived low satisfaction as indicated by the respondents and may have been the possible reason why lay counsellors are often found rude or unprofessional by patients.

Concerning the availability of free ARV medicines across the country, 96.4% had never found the pharmacy out of stock of their treatment. In this study only 4(3.6%) respondents had ever found the pharmacy out of stock of their ARVs. The National Drug Policy advocates for the constant availability of safe and efficacious medicines across the Namibian population (MoHSS1998:4). As ARVs are among the medicines that are provided for free to state facilities in Namibia, this is evidence of a functional and efficient supply chain from the central medical stores to the district hospitals and ultimately to the patients.

5.3.2.4 *Disease and treatment related factors*

The category with the highest number (65.2%) of non-adherent respondents was that of those on treatment for more than 3 years. As the number of patients on ART is cumulative over time, more respondents in this study had been on ART for more than 3 years. This is a positive indication that patients are being retained in care. However, if patients were defaulting or dropping off from treatment, the number of patients on treatment would stagnant. Like many other chronic conditions, over time some patients get tired of taking the ARV medicines and their adherence may reduce.

ARV side effects range from minor nausea, vomiting, skin rash to severe liver damage or life threatening Steven Johnson Syndrome (MoHSS 2014a:15). In this research it was worrisome to note that 57.1% of respondents were having or had previously suffered from ARV side effects resulting in them missing doses. This study suggested that side effects were associated with non-adherence.

Although only 53.6% of respondents had special instructions regarding ARVs and food, the majority of respondents believed that they could not take their ARVs when they have not eaten. This belief is contrary to Namibian ART guideline which discourages patients from missing their ARVs because they do not have any food (MoHSS 2014a:15).

While non-adherent respondents would be expected to be sick and with higher WHO clinical stage, only 20% of the respondents reported being sick in the past one month. The results of non-adherence are cumulative over time, thus respondents who were non-adherent during the data collection period might still have been healthy, but with continual

non-adherence, a depleted immune system and rising risk of opportunistic infections would eventually become sick patients with time.

5.3.2.5 Cultural and religious beliefs related factors

The study results showed that non-adherence at the study site may not be attributed to respondents' cultural beliefs. Only 1(0.9%) respondent responded that taking the ARV medicines offended their cultural beliefs. Of all the 112 respondents none believed that the HIV infection can be treated by cultural methods. Concerning respondents' religious beliefs and ARVs, 15.2% were of the opinion that HIV could be treated by religious methods without ARVs. Loeliger et al (2016:982) also highlighted the tension between ARV treatment and alternative therapies. Such beliefs present healthcare workers with a challenge to promote and foster adherence to ART among patients. In an era where some churches offer miracles of different forms, it appears HIV patients have not been spared and are sometimes advised to stop taking the ARVs as a sign of their healing resulting in non-adherence of the part of the patients.

5.3.2.6 Patient adherence

The eligibility criterion for this study was that only adults with adherence score of less than 95% were regarded as non-adherence and included in the study. From this study, 36.7% of the adults attending the clinic for follow care were non-adherent. Of these respondents, 61% had fair adherence while 39% had poor adherence. This is of concern as consequences of non-adherence include poor clinical outcomes, virological failure and oftenly resistance (Ehlers &Tshisuyi 2015: [1]). The study confirmed that non-adherence was prevalent at the study site and appropriate corrective measures are required.

5.3.2.7 Patient last viral load

It was noteworthy that 86.6% respondents in this study had unsuppressed viral load while only 13.4% had non-detectable viral loads, also known as maximum viral suppression. The viral loads support the pill count adherence method as the viral loads depict the

adherence level in patients. This is a public threat as resistant HIV strains could result due to the non-adherence (Ehlers & Tshisuyi 2015: [1]).

5.3.2.8 Patient WHO clinical stage

WHO clinical staging classifies HIV patients according to HIV defining illnesses. In this study the number of asymptomatic respondents in stage 1 was 51% almost proportional those who were symptomatic, stages 2, 3 and 4 at 49%. Of the symptomatic respondents, 24% were in stage 3 and 4 which agrees with the observation that 20% of the respondents had been sick in the past 1 month. As noted above, respondents' non-adherence may not have had immediate negative outcomes but the consequences of continual non-adherence are likely to be more prominent over time. In this study, the respondents viral load were already showing non-adherence although the majority of the patients were still not sick and in mainly stage 1 or 2.

5.3.2.9 Reasons for missing ARV medicines

Respondents cited a various reasons for missing their ARVs. Reasons ranged from those related to the patients themselves, their socio-demographics circumstances, system of care, the treatment and other religious and cultural factors. Reasons mentioned in the order of most common to least commonly were; forgetfulness (21.8%), alcohol use (15.5%), challenges in accessing treatment (9.9%), work commitments (9.9%), transport problems to health facility (7%), lack of food (4.9%), stress (4.2%) and travelling (4.2%). A notable 4.2% of the respondents mentioned discomfort due to ARVs including the side effects as reason for missed dose. In Uzochukwu (2009:192), HIV infection related sicknesses constituted 3.5% of reasons for missed dose, while 2.1% simply got tired of taking ARVs and missed their doses. Lastly social relationships, healthcare provider–patient relationships and religious beliefs each made up 1.4% of the reasons for missed dose. In Gari et al (2013:7) they also noted that poor beliefs in ARVs and belief in alternative treatments was associated with non-adherence. The majority of the reasons were patient related reasons, for example alcohol use, followed by socio-demographic, system of care, disease and treatment and lastly religious reasons. Some of the reasons mentioned in this study, for example forgetfulness, transport problems and work commitments are similar to those reported in other studies (Tsega et al 2015:375; Nghoshi 2016:43; Abdissa 2013:156). However, while lack of food was mentioned in this

study, in another study conducted in Northern Namibia, lack of food was not revealed as a reason for missed doses. Due to the Savanna climate in Northern Namibia, crop farming of staple foods like sorghum is possible which helps to enhance food security in most households. In contrast southern Namibia is predominantly semi-arid to desert which does not support crop farming but mainly small livestock husbandry (NSA 2013:13). Of note also is that, more than half of the respondents in this study were unemployed, which may have impacted on food insecurity among some respondents. As the study site serves a very vast geographic area, is also not surprising that some patients found it very difficult accessing the health facility?

5.3.2.10 Patient comments

The majority of the respondents' comments were directed towards the service delivery system. Main themes derived from the comments included; patients' satisfaction with the services they received from the nurses; although acknowledging inadequacy of nursing staff. Some respondents expressed the need for more nurses to be allocated to the division. Another commonly mentioned suggestion was need for decentralisation of ART services so that service can be nearer to the people. Other respondents suggested that the duration of ARV prescription should be increased for up to 6 months to frequent visits the clinic for refill. Another noteworthy suggestion was towards the integration of ART with other services, including the dispensing of medicines and reviews by a medical officer.

5.3 RECOMMENDATIONS

The findings from this study culminated in the following the recommendations. These recommendations are presented according to the constructs of the Health Belief Model and aimed towards promoting adherence. Proposed strategies to minimise non-adherence at the study site are as follows:

5.3.1 Perceived susceptibility

Patients on long term therapy including ART maybe susceptible to missing doses at some point in time as observed in this study or interrupting treatment completely. Healthcare workers are recommended to appropriately educate patients on the disease process of HIV and explain the need consistently attaining levels adherence greater than 95%. There

is need for patients to understand that not only interrupting treatment for a longer period has negative results on their health but missing doses can also be detrimental.

5.3.2 Perceived severity

The results showed that 86.6% of respondents had unsuppressed viral loads. Where applicable, healthcare workers should use results of viral loads to explain resistance at appropriate levels of understanding of patients as a way to promote understanding of the consequences of non-adherence. The concept of resistance should be emphasised in explaining severity of non-adherence to ART treatment.

5.3.3 Perceived benefits

Healthcare workers are advised to plot patients' biological markers including CD4 and viral loads on a graph to explain benefits of adherence to patients. This has potential of improving patients' perception of benefits of adherence to ART including the clinical outcomes.

The study recommends the clinic management promotes recruitment and the active involvement of "expert patients". This is an HIV positive patient who is attending that facility and has disclosed their HIV status and living positively. They are trained to motivating other patients and explaining benefits of adhering to treatment and practising healthy lifestyle while on ART treatment.

5.3.4 Perceived barriers

Use of active substances came out in the research as barrier to adherence. A multi-disciplinary approach is required to help patients to reduce or stop active substance use. As travelling contributed 4.2% of reasons for missed doses, improved linkages of patient referral are required. Healthcare workers need to strengthen patients' referral system across the different levels of HIV care so as to make it easier for patients to access continuing care.

Lack of transport to health facilities accounted for 7% of reasons for missed doses in this study. To improve access to ART services for patients in remote areas, ART can be integrated into existing outreach programmes. Work commitments contributed to 9.9% of reasons for missed dose in this study. It is proposed that HIV programs in the workplace

be intensified so as to increase awareness among employers on the need for treatment support of employees as well as to reduce stigma which is often experienced at workplaces.

Lack of food contributed to 4.9% of reasons for missed doses. The MoHSS needs to strengthen collaborative efforts with other non-governmental organisations on supportive care for ARV patients such as by providing food support.

Healthcare workers particularly lay counsellors need to be trained in basic communication skills and counselling techniques. Among the patient comments were statements of dissatisfaction with attitude of lay counsellors.

Adequate staff should be provided to the ART clinic as well as other department that provide supportive HIV care to patient.

The ARV clinic and the pharmacy staff should consider taking turns to go for lunch rather than closing the services during lunch hour.

5.3.5 Cues to action

Patients should be encouraged to identify treatment supporters of their choice which can provide motivation and remind patients to take treatment.

The MoHSS is recommended to adopt the use of Automated Short Message Service (SMS) as a way of reminding patients their ARVs. The Automated SMS from a telecommunications service provider can be linked to the Electronic Patient Monitoring System. The EPMS will automatically send SMSs which are directed to individuals with only their initials to take their ARVs when the scheduled time arrives. Project proposals to local service providers (such as Telecom and MTC Namibia) can be submitted on the desired services for consideration by the relevant MoHSS management.

Healthcare workers need to work with patients and significant others to structure reminders around individual patient daily routine so that patients remember to take their ARVs as forgetting remains a major barrier to patient adherence.

5.3.6 Self-efficacy

Healthcare workers should strengthen health education how to manage in case of missed doses. This helps to minimise non-adherence and missed doses.

Fifty-seven percent of respondents in this study had experienced side effects. There is need to anticipate and discuss potential side effects, the time they maybe experienced and importantly how to handle them. Some minor side effects may be managed using home remedies while some need intervention of healthcare workers. As such, patients need to be empowered on their roles during HIV care

As recommended above the expert patient can also assist by helping other patients' build-up their self-esteem to enhance successfully adherence to ART treatment.

5.4 CONTRIBUTIONS OF THE STUDY

The need remains for patients on ARV treatment to adhere to their treatment, yet until recently, there was limited data that identified the factors associated and the reasons for non-adherence in Namibia. Using scientific methods of research, this study has provided information about the level of non-adherence at a particular hospital in Namibia. The research investigated factors that affect patients' ability to adhere to ARV treatment. Documenting the factors associated with non-adherence by patients to ARV treatment provides a foundation to healthcare workers to anticipate causes of non-adherence and aim at preventing or minimising it before it causes significant negative outcomes among the susceptible group of patients. The study also provided a platform for patients to give feedback about the quality of care the patients are receiving and provide suggestions of improvement. Findings of this study are vital in policy making and review of guidelines on HIV management in adults. This information will also assist MoHSS and other stakeholders in decision-making and with setting-up strategies that can improve HIV care services. Finally the study allowed the principal investigator to engage vital stakeholders on mapping strategies to promote adherence among ART patients at the study site and other sites nationwide. The stakeholders meeting deliberated on innovative initiatives including the use of the automated SMS as reminders among others strategies.

5.5 LIMITATIONS OF THE STUDY

Although research methods used in this study ensured ethically and scientifically soundness, the study had limitations. Therefore the study findings should be viewed in the light of the following limitations

The respondents were only drawn from only one health facility which is a district hospital in a country with 35 districts. It would be desirable to include more districts across the nation. This limits the study results to be generalised for the whole population.

The adherence assessment used in this research was according to pill count. For lack of gold standard methods of measuring adherence, the pill count is widely used regardless of its limitations.

The study was conducted at a specific point in time hence cannot provide information about patient adherence over a period of time.

5.6 CONCLUDING REMARKS

The rate of non-adherence in this study of 36.7% using the pill count method was much higher than most studies from both high and low income settings. Characteristics that were associated with non-adherence included; being female, age group of 31-45years, unmarried, lack of HIV disclosure to community, feeling that taking ARVs reminds one of the HIV infection and experiencing side effects of ARVs. Reasons for non-adherence were outlined by the patients themselves. Forgetfulness, alcohol use, work commitments, transport problems, lack of food, stress and travelling were the most commonly mentioned reasons for missing ARV doses. Majority of respondents had unsuppressed viral loads. In line with these conclusions, the following recommendations mentioned below were made Non-adherence among patients on ART was determined and factors associated with the non-adherence at the study site identified. Very significant was the feedback from the patients through the comments they gave and these have been shared with the hospital management in the stakeholders meeting. Despite the limitations of this study particularly the use of respondents from only one site, this study has provided the study site with an in-depth knowledge on the HIV care services they are providing. The stakeholders' meeting was a hallmark for strategic initiatives in preventing and combating

non-adherence amongst patients at the study site. This study investigated the problem of non-adherence at the site and as Mark Levy stated “a problem well stated is half solved”. It is trusted that the findings of this study have significantly contributed in solving the problem on non-adherence experienced among HIV patients.

LIST OF REFERENCES

Abdissa, AE. 2013. *Determinant factors affecting adherence to antiretroviral therapy among HIV infected patients in Addis Ababa.*

From:

http://uir.unisa.ac.za/bitstream/handle/10500/13959/dissertation_abelti_ae.pdf?sequence=1 (accessed 25 March 2016).

Achappa, B, Madi, D, Bhaskaran, U, Ramapuram, JT, Rao, S & Mahalingam, S. 2013. *Adherence to antiretroviral therapy among people living with HIV.* North American Journal of Medical Science 5(3):220-223. From: <https://www.najms.org> (accessed 24 June 2016).

Adisa, R, Alutundu, MB & Fakeye, TO. 2009. *Factors contributing to non-adherence to oral hypoglycemic medications among ambulatory type 2 diabetes patients in Southwestern Nigeria.* Pharmacy Practice (Granada) 7(3):163-169.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4139048/pdf/pharmpract-07-163.pdf> (accessed 24 June 2016).

Amsalu, A, Wanzahun, G, Mohammed, T & Tariku, D. 2014. Factors associated with antiretroviral treatment adherence among adult patients in Wolaita Soddo Hospital, Wolaita Zone, Southern Ethiopia. *Science Journal of Public Health* 2(2):69-77. From: <http://article.sciencepublishinggroup.com/pdf/10.11648.j.sjph.20140202.15.pdf> (accessed 24 June 2016).

Aveyard, H. 2010. *Doing a literature review in health and social care: A practical guide.* 2nd edition. Maidenhead: Open University Press.

Babbie, E. 2009. *The practice of social research.* 12th edition. Belmont, CA: Wadsworth.

Barner, J. 2010. *Medication adherence: Focus on secondary database analysis.* ISPOR Student Forum.

Beer, L, Heffelfinger, J, Frazier, C, Mattson, C, Roter, B, Barash, E, Buskin, S, Rime, T & Valverde, E. 2012. Use of and adherence to antiretroviral therapy in a large U.S. sample of HIV-infected adults in care, 2007-2008. *The Open AIDS Journal* 6 (suppl 1:M21):213-223. From: <http://benthamopen.com/contents/pdf/TOAIDJ/TOAIDJ-6-213.pdf> (accessed 22 November 2015).

Bedford, T, Wilson, S & Ritchie, O. 2015. *Identifying and recruiting participants for health research*. London: OPM Group.

Bell, J & Waters, S. 2014. *Doing your research project a guide for first-time researchers*. 6th edition. England: Open University Press.

Bezabhe, WM, Chalmers, L, Bereznicki, LR, Peterson, GM, Bimirew, MA & Kassie, DM. 2014. Barriers and facilitators of adherence to antiretroviral drug therapy and retention in care among adult HIV-positive patients: a qualitative study from Ethiopia. *PLOS ONE* 9(5):e97353. From: <http://dx.doi.org/10.1371/journal.pone.0097353> (accessed 21 November 2015).

Biadgilign, S, Deribew, A, Amberbir, A, Deribe, K & Sahara, J. 2009. Barriers and facilitators to antiretroviral medication adherence among HIV-infected paediatric patients in Ethiopia: A qualitative study. *SAHARA-J: Journal of Social Aspects of HIV/AIDS* 6(4):148-154. From: <http://www.tandfonline.com/doi/pdf/10.1080/17290376.2009.9724943> (accessed 25 May 2016).

Bless, C, Smith, CG & Sithole, SL. 2013. *Fundamentals of social research methods an African perspective*. 5th edition. Cape Town: Juta.

Bolsewicz, K, Debattista, J, Vallely A, Whittaker, A, Fitzgerald, L. 2015. *Factors associated with antiretroviral treatment uptake and adherence: a review. Perspectives from Australia, Canada, and the United Kingdom*. *AIDS Care* 27(12):1429-1438. From: <http://www.tandfonline.com/doi/abs/10.1080/09540121.2015.1114992> (accessed 22 June 2016).

Boyer, S, Clerc, I, Bonono, CR, Marcellin, F, Bile, PC & Ventelou, B. 2011. Non-adherence to antiretroviral treatment and unplanned treatment interruption among people living with HIV/AIDS in Cameroon: Individual and healthcare supply-related factors. *Social Science and Medicine*, 72(8):1383-1392.

From: <http://dx.doi.org/10.1016/j.socscimed.2011.02.030> (accessed 16 June 2016).

Burns, N & Grove, SK. 2011. *Understanding nursing research building an evidence-based practice*. United States of America: Saunders.

Campos, LN, Guimarães, MDC & Remien, RH. 2010. *Anxiety and depression symptoms as risk factors for non-adherence to antiretroviral therapy in Brazil*. National Institute of Health. From <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2859347/> (accessed 16 June 2016).

Centre for Disease Control and Prevention. 2015. *Terms, definitions and calculations HIV surveillance Publications*.

From: www.cdc.gov/hiv/statistics/surveillance/terms.html (accessed 29 June 2016).

Charurat, M, Oyegunle, M, Benjamin, R, Habib, A, Eze, E, Ele, P, Ibanga, I, Ajayi, S, Eng, M, Mondal, P, Gebi, U, Iwu, E, Etiebet, MA, Abimiku, A, Dakum, P, Farley, J & Blattner, W. 2010. *Patient retention and adherence to antiretrovirals in a large antiretroviral therapy program in Nigeria: a longitudinal analysis for risk factors*. *PLoS One* 5 (5):e10584. From: <http://dx.doi.org/10.1371/journal.pone.0010584> (accessed 26 June 2016).

Chesney, MA. 2000. Factors affecting adherence to antiretroviral therapy. *Clinical Infectious Disease* 30(Suppl 2):S171-S176.

From: http://cid.oxfordjournals.org/content/30/Supplement_2/S171.full.pdf+html (accessed 26 June 2016).

Chi, BH, Cantrell, RA, Zulu, I, Mulenga, LB, Levy, JW, Tambatamba, BC, Reid, S, Mwanago, A, Mwinga, A, Bulterys, M, Sage, MS & Stringer, JS. 2009. Adherence to first-line antiretroviral therapy affects non-virologic outcomes among patients on treatment for more than 12 months in Lusaka, Zambia. *International Journal of Epidemiology* 38(3):746-756.

From: <http://ije.oxfordjournals.org/content/38/3/746.full.pdf+html> (accessed 26 June 2016).

De, AK & Dalui, A. 2012. Assessment of factors influencing adherence to anti-retroviral therapy for human immunodeficiency virus positive mothers and their infected children. *Indian Journal of Medical Science* 66(11):247-259. From: <http://www.indianjmedsci.org> (accessed 24 May 2015).

De Vos, AS, Strydom, H, Fouché, CB & Delport, CSL. 2011. *Research at grass roots: for the social sciences and human service professions*. 3rd edition. Pretoria: Van Schaik.

Do, HM, Dunne, MP, Kato, M, Pham, CV & Nguyen, KV. 2013. Factors associated with suboptimal adherence to antiretroviral therapy in Viet Nam: A cross-sectional study using audio computer-assisted self-interview (ACASI). *BMC Infectious Diseases*, 13(1):1-9. From: <http://www.biomedcentral.com/1471-2334/13/154> (accessed 16 August 2016).

Drachler, M de L, Drachler, CW, Teixeira, LB & De Carvalho Leite, JC. 2016. The scale of self-efficacy expectations of adherence to antiretroviral treatment: A Tool for identifying risk for non-adherence to treatment for HIV. *PLoS ONE* 11(2):e0147443. From: <http://doi.org/10.1371/journal.pone.0147443> (accessed 22 July 2016).

Ehlers, VJ & Tshisuyi, ET. 2015. Adherence to antiretroviral treatment by adults in a rural area of Botswana. *Curationis* 38(1), Art. #1255, 8 pages. From: <http://dx.doi.org/10.4102/curationis.v38i1.1255> (accessed 15 June 2015).

Eller, LS. 2009. Adherence, resistance and antiretroviral therapy. New Jersey, New York: AIDS Education and Training Centre. From: https://aidsetc.org/sites/default/files/resources_files/nynj-nurse-mod2-09.ppt (accessed 16 August 2016).

El-Khatib, Z, Katzenstein, D, Marrone, G, Laher, F, Mohapi, L, Petzold, M, Morris, L, Anna Mia Ekstrom, AM. 2011. Adherence to drug-refill is a useful early warning indicator of virologic and immunologic failure among HIV patients on first-line ART in South Africa. *PLoS ONE* 6(3):e17518.

From: <http://dx.doi.org/10.1371/journal.pone.0017518> (accessed 30 June 2016).

Engelkirk, PG & Duben-Engelkirk, J. 2015. *Burton's Microbiology for the health sciences*. 10th edition. Hong Kong: Wolters Kluwer/Lippincott Williams and Wilkins.

Flickinger, TE, Saha, S, Moore, R & Beach, MC. 2013. Higher quality communication and relationships are associated with improved patient engagement in HIV care. *Journal of Acquired Immune Deficiency Syndrome* 63(3):362-366.

From: <https://dx.doi.org/10.1097%2FQAI.0b013e318295b86a> (accessed 30 June 2016).

Franke, MF, Murray, MB, Muñoz, M, Hernández-Díaz, S, Sebastián, JL, Atwood, S, Caldas, A, Bayona, J & Shin, SS. 2011. Food insufficiency is a risk factor for suboptimal antiretroviral therapy adherence among HIV-infected adults in urban Peru. PubMed Central.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3377162/pdf/nihms377933.pdf> (accessed 30 June 2016).

Gari, S, Doig-Acuña, C, Smail, T, Malungo, JRS, Martin-Hilber, A & Merten, S. 2013. *Access to HIV/AIDS care: a systematic review of socio-cultural determinants in low and high income countries*. *BMC Health Services Research* 13(198):1-13.

From: <http://www.biomedcentral.com/1472-6963/13/198> (accessed 24 June 2016).

Giddens, A & Sutton, PW. 2013. *Sociology*. 7th edition. Malden, USA: Polity Press.

Gill, CJ, Hamer, DH, Simon, JL, Theo, DM & Sabin, LL. 2005. No room for complacency about adherence to antiretroviral therapy in sub-Saharan Africa. *AIDS* 19(12):1243-1249.

From:

http://journals.lww.com/aidsonline/Fulltext/2005/08120/No_room_for_complacency_about_adherence_to.1.aspx (accessed 24 June 2016).

Holtzman, CW, Shea, JA, Glanz, K, Jacobs, LM, Gross, R, Hines, J, Mounzer, K, Samuel, R, Metlay, JP & Yehia, BR. 2015. *Mapping patient-identified barriers and facilitators to retention in HIV care and antiretroviral therapy adherence to Andersen's Behavioral Model*. National Health Institute.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4400221/> (accessed 24 June 2016).

Ingersoll, KS & Cohen, J. 2008. *The impact of medication regimen factors on adherence to chronic treatment: a review of literature*. PubMed Central.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2868342/> (accessed 12 October 2015).

Ipinge, S. 2009. *HIV/AIDS in the Namibian context*. Windhoek: University of Namibia.

Ritchie, J & Lewis, J. 2009. *Qualitative research practice. A guide for social science students and researchers*. Pretoria: Van Schaik.

Jimmy, B & Jose, J. 2011. *Patient medication adherence: Measures in daily practice*. Oman Medical Journal 26(3):155-159

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3191684/pdf/OMJ-D-10-00107.pdf> (accessed 12 October 2015).

Joint United Nations Programme on HIV/AIDS. 2014. *Fast-track ending the AIDS epidemic by 2030*. Geneva, Switzerland: UNAIDS.

Joint United Nations Programme on HIV/AIDS. 2016. *Report on the global AIDS epidemic*. Geneva, Switzerland: UNAIDS.

Joubert, G & Ehrlich, R. 2007. *Epidemiology a research manual for South Africa*. 2nd Edition. Cape Town: Oxford University Press.

Kaleebu, P, Kirungi, W, Watera, C, Asio, J, Lyagoba, F, Lutalo T, Kapaata, A.A., Nanyonga, F., Parry, C.M., Magambo, B. and Nazziwa, J. 2015. Virological response and antiretroviral drug resistance emerging during antiretroviral therapy at three treatment centers in Uganda. *PLoS ONE* 10(12):e0145536.

From: <http://dx.doi.org/10.1371/journal.pone.0145536> (accessed 22 June 2016).

Kip, E, Ehlers, VJ & Van Der Wal, DM. 2009. Patients adherence to anti-retroviral therapy in Botswana. *Journal of Nursing Scholarship* 41(2):149-157.

From: <http://onlinelibrary.wiley.com/doi/10.1111/j.1547-5069.2009.01266.x/ful> (accessed 22 June 2016).

Kranzer, K, Lewis, JJ, Ford, N, Zeinecker, J, Orrell, C, Lawn, SD, Bekker, LG & Wood, R. 2010. Treatment interruption in a primary care antiretroviral therapy program in South Africa: cohort analysis of trends and risk factors. *PubMed Central*:17. From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3024539/> (accessed 3 June 2016).

Krousel-Wood, M, Holt, E, Joyce, C, Ruiz, R, Dornelles, A, Webber, LS, Morisky, DE, Frohlich, ED, Re, RN, He, J and Whelton, PK. 2015. Differences in cardiovascular disease risk when antihypertensive medication adherence is assessed by pharmacy fill versus self-report: The cohort study of medication adherence among older adults (CoSMO). *Europe PubMed Central*:412.

From: <https://www.europepmc.org/articles/pmc4514519> (accessed 3 June 2016).

Lam, WY & Fresco, P. 2015. Medication adherence measures: An Overview. *BioMed Research International*. From: <http://dx.doi.org/10.1155/2015/217047> (accessed 3 June 2016).

Li, L, Li, L, Lee, SJ, Wen, Y, Lin, C, Wan, D & Jiraphongsa, C. 2010. Antiretroviral therapy adherence among patients living with HIV/AIDS in Thailand. *PubMed Central*. From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2947817/pdf/nihms236945.pdf> (accessed 3 June 2016).

Loeliger, KB, Niccolai, LM, Mtungwa, LN, Moll, A & Shenoi, SV. 2016. *Antiretroviral therapy initiation and adherence in rural South Africa: community health workers' perspectives on barriers and facilitators*. PubMed Central.

From: <http://dx.doi.org/10.1080/09540121.2016.1164292> (accessed 24 June 2016)

Martin, S, Deborah, KE, Calabresse, S, Wolters, PL, Rogby, G, Brennan, T & Wood, LV. 2009. A comparison of adherence assessment methods utilized in the United States: perspectives of researchers, HIV-infected children, and their care givers. *AIDS Patient Care and STDs* 23(8):593-601. From: <https://dx.doi.org/10.1089/apc.2009.0021> (accessed 24 June 2016).

Miller, LG & Hays, RD. 2000. Adherence to combination antiretroviral therapy: Synthesis of the literature and clinical implications. *AIDS READER-NEW YORK* 10(3):177-185. From: <https://www.ncbi.nlm.nih.gov/labs/articles/10758022/> (accessed 24 June 2016)

Mills, EJ, Nachega, JB, Buchan, I, Orbinski, J, Attaran, A, Singh, S, Rachlis, B, Wu, P, Cooper, C, Thabane, L, Wilson, K, Guyatt, GH & Bangsberg, DR. 2006. Adherence to antiretroviral therapy in sub-Saharan Africa and North America: a meta-analysis. *JAMA* 296(6):679-690. From: <http://jama.ama-assn.org/cgi/content/full/296/6/679> (Accessed 12 April 2015)

MOHSS see Ministry of Health and Social Services.

Ministry of Health and Social Services. 1998. *National drug policy for Namibia*. Windhoek: GRN Printers.

Ministry of Health and Social Services 2007. *Namibia policy on HIV/AIDS*. Windhoek: GRN Printers.

Ministry of Health and Social Services. 2009. *Namibia National Health Policy Framework 2010-2020*. Windhoek. Namibia.

Ministry of Health and Social Services. 2012. *Nurse initiated and management of antiretroviral therapy training manual*. Windhoek. Namibia.

Ministry of Health and Social Services. 2013a. *The Namibia Demographic Health Survey 2013*. Windhoek. Namibia. And Rockville, Maryland, USA: MoHSS and ICF International.

Ministry of Health and Social Services. 2013b. *Ministry of Health and Social Services annual report 2012/2013*. Windhoek. Namibia.

Ministry of Health and Social Services. 2013c. *Namibia AIDS response progress*. Windhoek. Namibia.

Ministry of Health and Social Services. 2014a. *National guidelines for antiretroviral therapy*. Windhoek. Namibia.

Ministry of Health and Social Services. 2014b. *Namibia HIV sero-sentinel survey*. Windhoek. Namibia.

Ministry of Health and Social Services. 2014c. *Training for clinicians on the use of the Namibian guidelines for antiretroviral therapy*. 4th edition. Windhoek. Namibia.

Ministry of Health and Social Services. 2015. *THE NAMIBIA AIDS RESPONSE PROGRESS REPORT 2015 Reporting Period: 2013-2014*. Directorate of Special Programmes Division Expanded National HIV/AIDS Coordination Subdivision: Response Monitoring and Evaluation. Windhoek. Namibia.

Ministry of Regional and Local Government and Housing. 2002. *The Constitution of Namibia*. Windhoek. Namibia.

Mosby's Dictionary of Medicine, Nursing and Health Professions 2013, Sv "Health Belief Model". 9th Edition. St. Louis, Mo, Mosby/Elsevier

Muessig, KE, McLaughlin, MM, Nie, JM, Cai, W, Zheng, H, Yang, L & Tucker, JD. 2014. *Suboptimal antiretroviral therapy adherence among HIV-infected adults in Guangzhou, China. AIDS care-psychological and socio-medical aspects of AIDS/HIV*. PubMed Central. From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4024070/> (accessed 25 June 2016).

Nachega, JB, Mills, EJ & Schechter, M. 2010. Antiretroviral therapy adherence and retention in care in middle-income and low-income countries: current status of knowledge and research priorities. *Current Opinion in HIV and AIDS* 5(1):70-77. From: http://www.ceatenf.ufc.br/ceatenf_arquivos/Artigos/Antiretroviral%20therapy%20adherence%20and%20retention%20in%20care%20in.pdf (accessed 29 June 2016).

NSA see Namibia Statistics Agency.

Namibia Statistics Agency. 2013. *Namibia 2011 population and housing census main report*. Windhoek. Namibia.

Enhancing prescription medicine adherence: A national action plan. 2007. National Council on Patient Information and Education.

From:

http://www.talkaboutrx.org/documents/enhancing_prescription_medicine_adherence.pdf (accessed 25 June 2016).

Nghoshi, SS. 2016. *Assessment of determinants and levels of adherence to antiretroviral therapy in HIV-infected people in Opuwo district, Kunene region, Namibia*. Windhoek: University of Namibia.

From: repository.unam.edu.na/handle/11070/1101 (accessed 30 June 2016)

Nieuwkerk, PT & Oort, FJ. 2005. Self-reported adherence to antiretroviral therapy for HIV-1 infection and virologic treatment response: A meta-analysis. *Journal of Acquired Immune Deficiency Syndromes* 38(4):445-448.

Nuwagaba-Biribonwoha, H, Pals, S, Kidder, D, Carpenter, D, Katuta, F, DeLuca, N, Bupamba, M, Maokola, W & Bachanas, P. 2014. *Factors Associated with Non-Adherence to Antiretroviral Therapy among Patients Attending HIV Care and Treatment Clinics in Kenya, Namibia, and Tanzania*. PowerPoint presentation. Center of Disease Control. From: www.iapac.org/AdherenceConference/presentations/ADH7_80082.pdf (accessed 25 June 2016).

Oxford Advanced Learner's Dictionary of Current English. 2010. Sv "adherence" 'adult' 8th edition Oxford: Oxford University Press.

Okoronkwo, I, Okeke, U, Chinweuba, A & Iheanacho, P. 2013. *Nonadherence factors and sociodemographic characteristics of HIV-infected adults receiving antiretroviral therapy in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria*. Hindawi Publishing Corporation. From: <https://www.hindawi.com/journals/isrn/2013/843794/> (accessed 06 June 2016).

Payne, G & Payne, J. 2006. *Key concept in social research*. California: Sage.

Polit, DF & Beck, CT. 2012. *Nursing research: generating and assessing evidence for nursing practice*. 9th edition. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Punch, KF. 2005. *Introduction to social research: quantitative and qualitative approaches*. 2nd edition. London: SAGE.

Raosoft. 2004. *Sample size calculator by Raosoft*.

From: www.raosoft.com/samplesize.html (accessed 28 June 2016).

Reda, AA & Biadgilign, S. 2012. Determinants of adherence to antiretroviral therapy among HIV-Infected patients in Africa. Hindawi Publishing Corporation: *AIDS Research and Treatment*. From: <https://www.hindawi.com/journals/art/2012/574656/> (accessed 17 April 2015).

Sasaki, Y, Kakimoto, K, Dube, C, Sikazwe, I, Moyo, C, Syakantu, G, Komada, K, Miyano, S, Ishikawa, N, Kita, K and Kai, I. 2012. Adherence to antiretroviral therapy (ART) during the early months of treatment in rural Zambia: influence of demographic characteristics and social surroundings of patients. *BioMed Central*:8-11.

From: <https://ann-clinmicrob.biomedcentral.com/articles/10.1186/1476-0711-11-34>
(accessed 17 August 2016).

Sahay, S, Reddy, KS & Dhayarkar, S. 2011. Optimizing adherence to antiretroviral therapy. *The Indian Journal of Medical Research* 134(6):835-849.

From: http://www.ijmr.org.in/temp/IndianJMedRes1346835-4779805_011939.pdf
(accessed 15 April 2015).

Sapford, R & Jupp, V. 2006. *Data collection and analysis*. 2nd edition. London: SAGE.

Senkomago, V, Guwatudde, D, Breda, M & Khoshnood, K. 2011. Barriers to antiretroviral adherence in HIV-positive patients receiving free medication in Kayunga, Uganda. *Taylor & Francis Online*.

From: <http://www.tandfonline.com/doi/abs/10.1080/09540121.2011.564112> (accessed 20 May 2016).

Smeltzer, SCO, Hinkle, JL, Cheever, KH & Bare, B. G. 2013. Brunner and Suddarth's textbook of medical-surgical nursing. 13th edition. North American Edition, Combined Volume edition.). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Tabatabai, J, Namakhoma, I, Tweya, H, Phiri, S, Schnitzler, P, Neuhaan, F and Glob Health Action. 2014. *Understanding reasons for treatment interruption amongst patients on antiretroviral therapy--a qualitative study at the Lighthouse Clinic, Lilongwe, Malawi*. *PubMed Central*.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4185090/pdf/GHA-7-24795.pdf>
(accessed 15 June 2016).

Tomori, C, Kennedy, CE, Brahmbhatt, H, Wagman, JA, Mbwambo, JK & Likindikoki, S, Kerrigan, DL. 2014. *Barriers and facilitators of retention in HIV care and treatment services in Iringa, Tanzania: the importance of socioeconomic and sociocultural factors*. Taylor & Francis Online.

From: <http://www.tandfonline.com/doi/abs/10.1080/09540121.2011.564112> (accessed 26 June 2016).

Tsega, B, Srikanth, BA & Shewamene, Z. 2015. Determinants of non-adherence to antiretroviral therapy in adult hospitalized patients, Northwest Ethiopia. *Patient Preference and Adherence* 9:373-380.

From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4356699/pdf/ppa-9-373.pdf> (accessed 12 July 2016).

UNAIDS see Joint United Nations Programme on HIV/AIDS.

University of South Africa. Department of Health Studies. 2015. General tutorial letter for proposal: Tutorial Letter 301/0/2015. Pretoria: Unisa.

Uzochukwu, BS, Onmujekwe, OE, Onoka, AC, Okoli, C, Uguru, NP & Chukwuogo, OI. 2009. Determinants of non-adherence to subsidized anti-retroviral treatment in southeast Nigeria. *Health Policy and Planning* 24(3):189-196.

From: <http://heapol.oxfordjournals.org/content/24/3/189.full.pdf+html> (accessed 12 July 2016).

Venkatesh, KK, Srikrishnan, AK, Mayer, KH, Kumarasamy, N, Raminani, S, Thamburaj, E, Prasad, L, Triche, EW, Solomon, S & Safren, SA. 2010. Predictors of non-adherence to highly active antiretroviral therapy among HIV infected south Indians in clinical care : Implications for developing adherence interventions in resource-limited settings. *AIDS Patient Care and STDs* 24(1):795-803.

Wasti, SP, Van Teijlingen, E, Simkhada, P, Randall, J, Baxter, S & Kirkpatrick, Gc, VS 2012. Factors influencing adherence to antiretroviral treatment in Asian developing countries: a systematic review. *Tropical Medicine and International Health* 17(1):71.

WHO see World Health Organization.

World Health Organization. 2003. *Adherence to long term therapies: evidence for action*. From: http://www.who.int/chp/knowledge/publications/adherence_report/en/ (accessed 15 May 2015).

World Health Organization. 2007. *WHO case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV-related disease in adults and children*. From: <http://www.who.int/hiv/pub/vct/hivstaging/en/> (accessed 15 April 2015).

World Health Organization. 2013. *HIV treatment global update on HIV treatment 2013: Results, impact and opportunities WHO report in partnership with UNICEF and UNAIDS*. From: www.who.int (accessed 15 April 2015).

World Health Organization HIV/AIDS Department. 2016a. *HIV/AIDS care and treatment*. Geneva. Switzerland. From: <http://www.who.int/hiv/en/> (accessed 26 June 2016).

World Health Organization. 2016b. *HIV/AIDS online question and answer*. Geneva Switzerland. From: <http://www.who.int/features/qa/71/en/> (accessed 26 June 2016).

WHO/UNAIDS/UNICEF. 2011. *Global HIV/AIDS response epidemic update and health sector progress towards universal access. Progress report..* From: http://www.who.int/hiv/pub/progress_report2011/en/ (accessed 20 February 2016).

ANNEXURES

ANNEXURE A: ETHICAL CLEARANCE FROM UNISA



**UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE**

REC-012714-039

HSHDC/513/2016

Date: 2 March 2016

Student No: 5674-996-1

Project Title: Factors associated with non-adherence to antiretroviral (ARV) treatment in adults at a Hospital in Namibia.

Researcher: T Chigova

Degree: MA in Nursing Science

Code: MPCHS94

Supervisor: Prof BL Dolamo

Qualification: D Cur

Joint Supervisor: -

DECISION OF COMMITTEE

Approved



Conditionally Approved



A handwritten signature in dark ink, appearing to read "L. Roets".

Prof L Roets

CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

ANNEXURE B: APPLICATION TO NAMIBIA RESEARCH COMMITTEE TO CONDUCT STUDY

LETTER FOR PERMISSION TO CONDUCT STUDY

Mrs T. CHIGOVA
P. BAG 2101
KEETMANSHOOP

18 March 2016

TO: THE PERMANENT SECRETARY
MINISTRY OF HEALTH AND SOCIAL SERVICES
P. BAG 13198
WINDHOEK
ATT: THE RESEARCH COMMITTEE

RE: APPLICATION FOR AUTHORISATION TO CONDUCT RESEARCH FOR STUDY PURPOSE

I would like to apply for authorisation to conduct research for the purpose of study. The title of the study is *Factors associated with non-adherence to antiretroviral treatment in adult patients at a hospital in Namibia*. The aim of the study is to minimise non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment. This study will be a quantitative descriptive study. Data will be collected through review of patients' records and structured personal interviews using a questionnaire. The respondents' interviews will take between 10–15 minutes. The research assistants will be third year student nurses from Keetmanshoop Regional Health Training Centre. I am currently based at Keetmanshoop Regional Health Training Centre as a lecturer for the Registered Nurse diploma programme. I am currently undertaking a Master degree in Nursing with the University of South Africa. The research is a requirement for the completing of this course.

The research proposal, the questionnaire and other relevant documents are attached for your information. Patients will not incur any harm or costs due to participation in this study. All costs involved in the research will be covered by me.

This research proposal has been approved by the UNISA ethics committee.

Date of approval : 2 March 2016

Approval number: HSHDC/513/2016

Looking forward to your positive response

Yours faithfully

Mrs T. CHIGOVA

Lecturer Diploma Project Keetmanshoop Regional Health Training Centre

Ministry of Health and Social Services

Cell: 0813420668, Tel: 063-2209016

e-mail:temptationchigova@gmail.com

ANNEXURE C: CLEARANCE LETTER FROM NAMIBIA RESEARCH ETHICS COMMITTEE



REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198
Windhoek
Namibia

Ministerial Building
Harvey Street
Windhoek

Tel: 061 – 203 2125
Fax: 061 – 222558
E-mail: msimasiku@mhss.gov.na

OFFICE OF THE PERMANENT SECRETARY

Ref: 17/3/3

Enquiries: Mr. M. Simasiku

Date: 15 April 2016

Mrs. Temptation Mutandi Chigova
P. O. Box 1447
Keetmanshoop
Namibia

Re: Factors related to Non-Adherence to Anti-Retroviral (ARV) treatment at Keetmanshoop clinic, Namibia.

1. Reference is made to your application to conduct the above-mentioned study.
2. The proposal has been evaluated and found to have merit.
3. **Kindly be informed that permission to conduct the study has been granted under the following conditions:**
 - 3.1 The data to be collected must only be used for academic purpose;
 - 3.2 No other data should be collected other than the data stated in the proposal;
 - 3.3 Stipulated ethical considerations in the protocol related to the protection of Human Subjects should be observed and adhered to, any violation thereof will lead to termination of the study at any stage;

ANNEXURE D: SIGNED DECLARATION FORM FOR DATA COLLECTORS

Annexure D: Declaration form for Assistant investigator

FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL (ARV) TREATMENT IN ADULTS AT A HOSPITAL IN NAMIBIA

My name is HOSEA STEPHANUS I am a third year student nurse in diploma in nursing and midwifery science at Keetmanshoop Regional Health Training Centre. I hereby declare that I have wilfully agreed without force to be a research assistant in the research ***Factors associated with non-adherence to antiretroviral (ARV) treatment in adults at a hospital in Namibia. The aim of this study is to minimize non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment***

I have been trained to collect data for this research and I agree to the set standards of data collection as laid down by the Principal Investigator Mrs Temptation Chigova. I pledge to observe all human rights of patients I shall work with.

I am aware that this form binds me to the contents of this consent. Transport and telephone calls costs and lunch meals will be provided by the principal investigator Mrs T. Chigova. I will be paid an incentive of ten Namibian dollars per every interview of data collection with a patient. The principal investigator shall not take responsibility in case of assistant investigator being involved in a road accident, or encounter problems in the process of carrying out interviews in the homes of respondents.

I pledge to keep all information I shall collect for purposes of this study in strict confidentiality. I have read the above consent form, I have fully understood its contents and I consent to participate in this research project as a research assistant.

Name of assistant investigator HOSEA Signature [Signature]
Date 26/7/16

Name of witness [Signature] Signature [Signature] Date 26/7/16

Principal investigator: Mrs Temptation Chigova Signature [Signature] Date 26/7/16

Annexure D: Declaration form for Assistant investigator

FACTORS ASSOCIATED WITH NON-ADHERENCE TO ANTIRETROVIRAL (ARV) TREATMENT IN ADULTS AT A HOSPITAL IN NAMIBIA

My name is Rosalia Nqanqel. I am a third year student nurse in diploma in nursing and midwifery science at Keetmanshoop Regional Health Training Centre. I hereby declare that I have wilfully agreed without force to be a research assistant in the research ***Factors associated with non-adherence to antiretroviral (ARV) treatment in adults at a hospital in Namibia. The aim of this study is to minimize non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment***

I have been trained to collect data for this research and I agree to the set standards of data collection as laid down by the Principal Investigator Mrs Temptation Chigova. I pledge to observe all human rights of patients I shall work with.

I am aware that this form binds me to the contents of this consent. Transport and telephone calls costs and lunch meals will be provided by the principal investigator Mrs T. Chigova. I will be paid an incentive of ten Namibian dollars per every interview of data collection with a patient. The principal investigator shall not take responsibility in case of assistant investigator being involved in a road accident, or encounter problems in the process of carrying out interviews in the homes of respondents.

I pledge to keep all information I shall collect for purposes of this study in strict confidentiality. I have read the above consent form, I have fully understood its contents and I consent to participate in this research project as a research assistant.

Name of assistant investigator Rosalia Signature R. Nqanqel ^{SR}
Date 26/7/16

Name of witness AT Chigova Signature [Signature] Date 26/7/16

Principal investigator: Mrs Temptation Chigova Signature [Signature] Date 26/7/16

ANNEXURE E: DECLARATION FORM FOR DATA COLLECTORS

Good day

My name isI am a third year student nurse working in this hospital. I am a data collector in the study: ***Factors associated with non-adherence to antiretroviral (ARV) treatment in adults at a hospital in Namibia***, and my role is to collect data from respondents. The aim of the study is to minimise non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment. The study is being conducted by Mrs Temptation Chigova a UNISA Masters student. If you agree to take part in the research, a student nurse will ask you a few questions. This will be done at your home or any place you choose where the conversation will be private. The interview is expected to take between 10-15 minutes. A research assistant will use a questionnaire to ask you questions and you reply orally and your responds will be written down in the questionnaire by the research assistant. The information received from respondents will only be accessible to the researcher and will be analysed to draw meaning and results. The questions are available in English, Oshiwambo and Afrikaans. You are free to choose the language you are comfortable with. You have full right to decline to be interviewed either partly or totally without any effect on the care provided to you or your significant others. You may withdraw at any time. In case you consent to participate in the interview, I kindly request you to provide me your honest answer to the questions you want to respond to as this would help me to come up with genuine conclusions and recommendations that would potentially help Namibia Ministry of Health and health facilities improve these HIV care services. There are no rewards for participating in this investigation. The findings from this study will be communicated to the Sister in Charge of this clinic via the office of the senior medical officer. I am happy to answer any questions you may have; do you have questions?

For further questions about this research and related issues, contact Mrs Temptation Chigova, principal investigator at +264813420668. Address: Keetmanshoop Regional Health Training Centre. Keetmanshoop Hospital grounds. Keetmanshoop.

If you feel human rights are not being correctly followed in this study you are free to contact chairperson of the UNISA Department of Health Ethics Committee:

Prof. L. Roets

E-mail: roetsl@unisa.ac.za

Phone: (012) 429 2226

Fax: (012) 429 6688

If you so wish to participate in this study, before we commence our interview I kindly ask you to sign the consent form below

ANNEXURE F: INFORMED CONSENT FORM

CONSENT TO PARTICIPATE IN THE RESEARCH

I can confirm that before I participated in this study I read the above invitation to participate in the study / the above invitation has been read to me; I have fully understood its contents and I volunteer to participate in this study.

Respondent code_____ Signature_____ Date_____

Name of interviewer _____Signature_____ Date_____

ANNEXURE G: ENGLISH DATA COLLECTION TOOL

English Questionnaire

Research Title: Factors associated with non-adherence to antiretroviral (ARV) treatment in adults at a hospital in Namibia

Research Aim: The aim of the study is to minimise non-adherence to antiretroviral (ARV) treatment amongst HIV/AIDS adult patients at a hospital in Namibia thereby promoting successful outcomes in patients on ARV treatment.

1. Socio- demographic and economic characteristics

Instruction: - please provide short answer to the socio-demographic questions

Sequential number	Questions	Coding categories	code	Skip
	Patient unique code			
1.1.	Sex	Male	1	
			2	
		Female		
1.2.	Age in completed years	21-30	1	
		31 - 45	2	
		46-64	33	
		65 and above		
1.3.	Ethnicity	Nama- Damara	1	
		Oshiwambo	2	
		Caprivian /Okavango	3	
		Otjiherero	4	
1.4.	Religion	Catholic	1	
		Orthodox	2	
		Protestant	3	
		Islam	4	
		Hindu	5	
		African tradition	6	
1.5.	Marital status	unmarried	1	skip
		Married	2	
		separated/divorced	3	
		widow or widower	4	
1.6.	Level of education	illiterate	1	skip
		Basic education	2	
		Elementary education	3	
		college diploma and above	4	

1.7.	Living condition	living alone	1	
		living with family	2	
		living with friend	3	
		living with others	4	
1.8	source of support	self-support	1	
		Families	2	
		NGOs	3	
		No support	4	
1.9.	current employment status	Employed	1	
		Unemployed	2	

2. Patient related factors

Instruction: for the statements assessing relationship between individual patient related factors and non-adherence to antiretroviral treatment.

Sequential Number	Questions	Coding categories	Code	Skip
2.1.	ART is essential for the HIV patient	strongly agree	1	
		agree	2	
		Uncertain	3	
		disagree	4	
2.2.	Are you feeling comfortable to take ART in the presence of others	Comfortable	1	
		Undetermined	2	
		Uncomfortable	3	
2.3.	Do use any active substances	No	1	
		Yes	2	
2.4.	In the past 1 month how often did you take active substances	Did not use alcohol	1	
		1-2 times a week	2	
		3-4 times a week	3	
		4-7 times a week	4	
2.5.	Community disclosure	Yes	1	
		No	2	
2.6.	In the past 1 month how would you describe	Generally happy	1	
		Neutral	2	
		Somehow depressed	3	

	your emotional status	Very depressed	4	
2.7.	Do you feel taking your ARVs remind you of the HIV infection	No	1	
		Somewhat so	2	
		strongly feel so	3	

3. System related factors

Instruction: for the following statements related to the system of HIV care at this hospital, please express your opinion

		SA	A	Skip
3.1.	How convenient do you find this clinic for your HIV care services	Convenient	2	
		undetermined		
		Inconvenient		
3.2.	How satisfied are you with the healthcare workers	Satisfied	1	
		undetermined	2	
		Dissatisfied	3	
3.3.	Have you ever found the pharmacy out of stock of your ARVs	Never	1	
		Once	2	
		More than once	3	

4. Disease and treatment related factors.

Instruction: for the following statements related to the HIV disease and ARV treatment, please express your opinion using provided answers

4.1.	Duration on ARV treatment	3 – 12 months 1 – 3 years More than 3 years	1	Skip
4.2.	Have you ever experienced any side effects to ARVs	No	1	
		Yes	2	
4.3.	Is there a special instruction regarding your ARVs and food	No	1	
		Yes	2	
4.4.	How have your general health status	healthy	1	
		somewhat healthy	2	
		sick	3	

	been in past 1 months	Very sick	4	
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5. Cultural and religious beliefs related factors

Instruction: for the following statements are related to HIV, culture and religion, please express your opinion using provided answers

Sequential number	Questions		Code	Skip
5.1. 5	Does taking ARV medicines offend any of your cultural beliefs	no	1	
		somewhat offend	2	
		Strongly offend	3	
5.2.	Do you think HIV infection can be treated by cultural methods without ARV medicines	no	1	
		Don't know	2	
		Yes	3	
5.3.	Does taking ARV medicines offend any of your religious beliefs	1. no	1	
		2. somewhat offend	2	
		3. strongly offend	3	
5.4.	Do you think HIV infection can be treated by religious methods without ARV medicines	no	1	
		Don't know	2	
		Yes	3	

When you missed your ARV medicines what do you feel was the reason/s

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Any other comments

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Dependent variable: Non-adherence markers

Sequential number	Questions	Category	Code	Skip
6.1	Number of missed doses in last 30 days (once daily dose regimens)	0 or 1 (95% :good adherence)	1	
		2–8 doses (75<95 : fair adherence)	2	
		>8 doses or more(<75 : poor)	3	
6.2.	Patient last viral load	Non-detectable	1	
		Below 1000copies per ml	2	
		More than 1000 copies per ml	3	
6.3	Patient WHO clinical stage	Stage 1	1	
		Stage 2	2	
		Stage 3 and 4	3	

Thank you very much for your time.

ANNEXURE H: OSHIWAMBO TRANSLATION TOOL

Momudhingoloko gwomuntu

Elombwelo: gandja omayamukulo pauhupi kokapulaapulo momudhingoloko gwomuntu.

Elandulathano lyoonomola	omapulo	Coding categories	code	skip
	Omomola yomeholamo			
1.1	Omukwashike	Omukiintu	1	
		omulumentu	2	
1.2	Oomvula dhagwanapo	21-30	1	
		31-45	2	
		46-64	3	
		65 nopombanda	4	
1.3	Omuhoko	Nama/Damara	1	
		Omuwambo	2	
		omuCaprivi/Kavango	3	
		omuhherero	4	
1.4	Eitaalo	Omukriste	1	
		Omumoslema	2	
		omuHindu	3	
		African tradition	4	
1.5	Ehokano	Ina hokana	1	skip
		A hokana	2	
		Ya topoka/ teka	3	
		Omuselekadhi/ omusilwalume	4	
1.6	Onkatu yeilongo	Inaa longwa	1	skip
		Ahulila mondondo 8	2	
		A hulila mondondo 12	3	
		liputudhilo yopombanda	4	

1.7	Ehala lyokuza	Oye awike	1	
		Hazi naakwanezimo	2	
		Hazi nookuume	3	
		Hazi na yalwe	4	
1.8	liyemo	Kuyemwene	1	
		Kaakwanezimo	2	
		Omahangano gaashi gepangelo	3	
		Kapuna iiyemo	4	
1.9	lilonga pethimbo ndika	Omunashilonga	1	
		Halongo kuye mwene	2	
		Eli moshipundi shevululuko	3	
		Iha longo	4	

2. Uyelele wunasha nomnuuvu.

Elandulathano lyoonomola	Omapulo	Coding categories	Code	skip
2.1	Ethembo waninga kepango lyo HIV	Oomwedhi ndatu sigo omulongo nambali	1	
		Omvula yimwe sigo ndatu	2	
		Ethembo livule poomvula ndatu	3	
2.2	Konima yomwedhi gumwe oho kala wu uvite ngiini momaiuvo goye	Ndahafa	1	
		Ndili ngaa pokati	2	
		Ndalimbililwa	3	
		Ndalimbulilwa shinene	4	

2.3	Oho longitha ngiini omalovu konima yomwedhi gumwe?	Ihandi longitha	1	
		Lumwe sigo lwaali moshiwike	2	
		Lutatu sigo lune moshiwike	3	
		likando ine sigo iheyali moshiwike	4	
2.4	Ohonu shithike peni?	Uuhalasa utatu	1	
		Uuhalasa utatu sigo utano	2	
		Uuhalasa wuvule utano	3	
2.5	Konima yomasiku omilongo ndatu owa dhimbwa lungapi okunwa omiti dhoye dho ARV	Inandi dhimbwa nande osha	1	
		Lumwe	2	
		Lwaali nenge shi vule po	3	
2.6	Ohashi kudhimbulukitha kutya owuna ombuto yo HIV ngele tonu omiti?	Aaye	1	
		Oompito dhimwe	2	
		Osho handi kala nduuvite	3	
2.7	Oho dhiladhila kutya aantu ita ya kala yeku hole ngele oya tseya kutya ohonu ooARV?	Aaye	1	
		Oompito dhimwe	2	
		Ohandi shi ipula kehe ethimbo	3	

3. Omukithi nepango

Elandulathano lyoonomola	omapulo	Coding caegories	code	skip
3.1	Ngele wanu omiti dho ARV ohadhi ku etele uupyakadhi washa?	Aaye	1	
		Oompito dhimwe	2	
		Kehe ethimbo	3	
3.2	likando ingapi wa adhika kuupyakadhi mbono kuza shi wa tameka okunwa ooARV?	Inandi adhika sha	1	
		Oshikando shimwe sigo itatu	2	
		likando yi vulithe pu itatu	3	
3.3	Ohonu omiti lungapi mesiku?	Lumwe	1	
		Lwaali	2	
4.1	Ohonu oopela ngapi dho ARV poshikando?	Yimwe	1	
		Mbali	2	
		Dhi vulithe pu mbali	3	
4.2	Opuna elombwelo lyasha lyo ARV li ikwatelela kiikulya yoye?	Kapuna elombwelo lyasha	1	
		Okunwa oopela manga mepunda mwaa nasha	2	
		Inolya iikulya yimwe manga to longitha oopela dho ARV	3	

4.4	Uukolele woye owuli ngiini kuza koomwedhi ndatu dha piti?	Owu li nawa	1	
		Owu li ngaa	2	
		Onda li tandi ehama	3	
		Onda li tandi ehama unene	4	

5. Omithigululwakalo nomaitaalo.

Elombwelo: omatumbulo tag landula ogi ikwatelela ko HIV nomithigululwakalo osho wo omaitaalo. Alikana gandja omaiuvu goye to longitha omayamukulo ga gandja.

Elandulathano lyoonomola	omapulo	Coding categories	code	Skip
5.1	Okunwa oopela dhoye dho ARV otashi shundula eitaalo lyoye lyopamuthigululwakalo?	Aaye	1	
		Otashi shundula kashona	2	
		Otashi shundula unene	3	
5.2	Owi itayela kutya ombuto yo HIV ota yi vulu kupangwa pamuthigululwakalo pwaana okunwa oopela dho ARV?	Aaye	1	
		Kandishiwo	2	
		Ee	3	
5.3	Okunwa oopela dhoye dho ARV ota ku shundula eitaalo lyoye lyopangeleka?	Aaye	1	
		Oompito dhimwe	2	
		Otashi shundula	3	
		Otashi shundula unene	4	

5.4	Owa itayela kutya ombuto yo HIV ota yi vulu kupangwa pamukalo weitaalo lyoye kaapuna oo ARV?	Aaye	1	
		Kandishishi	2	
		Ee	3	

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Tangi unene kethimbo lyoye

ANNEXURE I: AFRIKAANS TRANSLATION TOOL

Data-insameling hulpmiddel

Vraelys

Navorsingstitel: faktore wat verband hou met nie nakoming van antiretrovirale behandeling (vigs behandeling) spesifiek vir volwassenes by 'n hospital in Namibie.

Navorsingsdoel: Die doel van die studie is om nakoming te fasiliteer onder MIV/VIGS volwasse pasiente by n hospital in Namibie sodoende suksesvolle uitkomst te bevorder in pasiente op antiretrovirale behandeling.

1.Sosio-demografiese vrae

Opdrag: Verskaf asseblief kort antwoorde op die sosio-demografiese vrae.

Sekwensiele nommer	Vrae	Kodering kategoriee	Kode	Slaan oor
	Pasient unieke kode			
1.1	Geslag	Manlik	1	
		Vroulik	2	
1.2	Ouderdom in voltooide jare	21-30	1	
		31-45	2	
		46-64	3	
		>65	4	
1.3	Verkieste taal	Nama-damara	1	
		Oshiwambo	2	
		Caprivian/ Okavango	3	
		Otjiherero	4	

1.4	Godsdiens	Catholic	1	
		Orthodox	2	
		Protestant	3	
		Islam	4	
		Hindu	5	
		Afrikaner-tradisie	6	
1.5	Huwelikstatus	Enkel	1	
		Getroud	2	
		Samewoning	3	
		Geskei	4	
1.6	Vlak van opvoeding	Ongeletterd	1	
		Basiese opvoeding	2	
		Elementere opvoeding	3	
		Kollege diploma of hoer	4	
1.7	Lewenstoestand	Leef alleen	1	
		Leef met familie	2	
		Leef met vriende	3	
		leef met ander	4	
1.8	Bron Van ondersteuning	Self onderhoudend	1	
		gesinne	2	
		Nie-regerings organiasies	3	
		Geen ondersteuning	4	
1.9.	Huidige werks status	Werkend	1	
		Werkloos	2	

2. Pasiënt- verwante faktore

Opdrag: Vir die stellings beoordeling vir di verhouding tussen pasiënt verwante faktore en nakoming van antiretrovirale behandeling.

Sekwensiele nommer	Vrae	Kodering kategoriee	Kode	Slaan oor
2.1	In die afgelope 1 maand, hoe sou jy jou emosionele status beskryf?	Oor die algemeen gelukkig Neutraal Een of ander manier depressief Baie depressief	1	
			2	
			3	
			4	
2.2	In die afgelope 1 maand. Hoe dikwels het jy alkohol geneem	Geen alkohol 1-2 maal per week 3-4 maal per week 4-7 maal per week	1	
			2	
			3	
			4	
2.3	Wanneer jy alkohol neem, hoeveel drink jy		1	
			2	
			3	
			4	
2.4	In die afgelope 30 dae, hoeveel keer het jy vergeet om jou MIV/VIGS behandeling te neem.	Nooit Een maal Twee keer of meer	1	
			2	
			3	
2.5	Voel jy deur dat jy die MIV/VIGS behandeling neem herinner jou aan di MIV infeksie	Nee Op een of ander manier Ek voel sterk so	1	
			2	
			3	
2.6	Voel jy dat mense nie van jou gaan hou sodra hulle bewus word dat jy op MIV/VIGS behandeling is	Nee Ja	1	
			2	

2.7	Voel jy gemaklik om jou antiretrovirale behandeling te neem voor ander mense	Gemaklik Ongemaklik Ken nie	1	
			2	
			3	

3. Stelsel verwante faktore

Sekwensiele vrae	Vrae	Kode kategorie	kode	Slaan oor
3.2	Van waar ek bly kan ek toegaan het tot hierdie kliniek sonder problem.	Ja Nee Ander (spesifiseer)	1	
			2	
			3	
3.1	Ek voel my verhouding met gesondheid personeel in di kliniek is van professionele standard		1	
			2	
			3	
3.3	Het jy al ooit ondervind dat die apteek uit voorraad was van jou antiretrovirale behandeling.		1	
			2	
			3	

4. Siekte en behandeling verwante faktore

Opdrag: Vir die volgende stellings wat verwand hou met die MIV/VIGS siekte en behandeling, stel asseblief jou mening met behulp van verskafde antwoorde.

Sekwensiele vrae	Vrae	Kode kategorie	kode	Slaan oor
4.1	Hoe lang is jy op antiretrovirale behandeling	3-12 maande	1	
		1-3 jare	2	
		Meer as 3 jaar	3	
4.2	Hoeveel keer het jy gely aan newe-effekte van antiretrovirale behandeling vandat jy daarmee begin het	Nooit	1	
		1-3 keer vandat ek begin het met die behandeling	2	
		Meer as 3 keer vandat k begin het met die behandeling	3	
4.3	Is daar 'n spesiale instruksie in verband met jou antiretrovirale behandeling en kos	Neem op n lee mag	1	
		Moenie met sekere kos tipes neem nie	2	
		Ander	3	
4.4	Hoe is jou algeme gesondheid status in die afgelope 3 maande	Gesond	1	
		Een of ander manier gesond	2	
		Siek	3	

5. Kulturele en godsdienstige oortuigings

Opdrag: vir die volgende stellings in verband met die MIV/VIGS, kultuur en godsdiens, lug asseblief jou opinie deur gebruik van die voorgestelde antwoorde.

Sekwensiele nommer	Vrae	Kode kategoriee	kode	Slaan oor
5.1	Beledig die gebruik van antiretrovirale behandeling enige van jou kulturele oortuigings	Nee Een of ander manier beledigend	1 2 3	
5.2	Dink jy die MIV- infeksie kan behandel word deur culture metodes sonder antiretrovirale behandeling	Ja Nee Ek weet nie	1 2 3	
5.3	Beledig die gebruik van antiretrovirale behandeling jou godsdienstige oortuigings	Nee Een of ander manier beledigend Beslis beledigend	1 2 3	
5.4	Dink jy die MIV- infeksie kan behandel word deur godsdiens metodes sonder antiretrovirale behandeling	Ja Nee Ek weet nie	1 2 3	

Volgorde nommer	Vrae		Kode	Skip
6.1.	Pasient se gehegtheid telling by tablet tel metode	Goed Redelik Swak	1 2 3	
6.2.	Pasiente se laaste virus	Nie meet baar Laer as 1000 kopieë per milliliter Meer as 1000 kopieë per milliliter	1 2 3	
6.33.	Pasient se kliniese fase	Laag 1 Laag 2 Laag 3 en 4	1 2 3	

6.2. Enige ander komintaar

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Dankie vir u tyd